Keynote and Plenary Paper Abstracts

Keynote Abstract

NATURAL RESOURCES CONSERVATION AND CLIMATE CHANGE ADAPTATION THE BIG CHALLENGE FOR S&T

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Abstract

Declared as the Year of Biodiversity, 2010 was agreed upon in 2002 by the world's leaders as the year to achieve a significant reduction in biodiversity loss. However, based on all available evidence reviewed by the Secretariat of the CBD and UNEP's World Conservation Monitoring Centre, as presented in the recently launched Global Biodiversity Outlook 3 (GBO3), this target has not been met. The challenge is huge because current trends show intensifying pressures on bioresources that brings us closer to the tipping points. As Ahmed Djoghlaf, Executive-Secretary of CBD says, "business as usual is no longer an option if we are to avoid irreversible damage to the life-support systems of our planet". Biodiversity conservation can make a big contribution to moderating climate change and toward this effort everyone must be involved particularly the indigenous peoples and fisher folks whose lives depend on a daily take from the forest and the sea. The S&T community can do much by providing the scientific basis for policies in ecorestoration, conservation and climate change adaptation and by reaching out to those who are most vulnerable.

Keywords: conservation, climate change, adaptation

Plenary Abstract (Governing People and Nature)

NATURE AND PEOPLE: NEED FOR GOVERNANCE

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Abstract

The relationship between people and nature is complex, diverse, and full of challenges. This relationship can be categorized generally into three: coexistence, conflict, and symbiosis. Coexistence implies that nature and people live together peacefully and harmoniously with each other. Coexistence may turn either into conflict or into symbiosis. Conflict arises in situation wherein nature has harmful effects on the environment which is detrimental to people, and when people destroys nature. Symbiosis is an association whereby the entire natural environment is protected by the people and in turn nature will provide biodiversity resources (known as natures goods and services: food and shelter) essential for human existence. People depend on nature and vice versa, so that mutual concern among and between them is necessary.

Societies all over the world impose environmental laws that influence man-nature relationships. Such laws aim to provide environmental standards and guide the formulation of management strategies for the conservation and enhancement of the environment and the natural resources for the benefit of the people in a sustainable manner. The Philippines is no exception.

As people continue to know and understand more about the natural processes occurring in the environment "the natural world had emerged as a focus of ethical concern" (Rolston, 2003). Environmental ethics bring about the fact that all life forms on earth have the right to live in this world and that man has a great responsibility to nature.

To some extent, there is also a need to recognize human rights issues relative to the formulation of environmental policies. As Siila Watt-Cloutier pointed out in her inaugural lecture for the LaFontaine-Baldwin Lecture Series, "The destruction of the Arctic environment and the culture and economy of Inuit as a result of virtually unrestricted emissions of greenhouse gases by the United States was violating our human rights guaranteed in the 1948 American Declaration on the Rights and Duties of Man,..Climate Change was infringing our rights to subsistence to health, to use of our traditional lands, and to our culture and environment".

Keyword: climate change, environmental policies, environmental laws

Plenary Abstract (Enterprising with Nature)

ENTERPRISING WITH NATURE: PRODUCTIVITY, PROFITABILITY AND SUSTAINABILITY OF NATURAL RESOURCES IN A CHANGING AND DEVELOPING WORLD

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Abstract

In the 21st century, we are faced with the issue of global warming, along with the challenge of sustainable development. As a consequence, the environment became a very exciting and challenging entity for development and management. Over time, it has been the focus of concerted efforts particularly on research and development, education and training, and protection and conservation. Today, it has opened doors for business activities which encourage the active participation of the key players and stakeholders. With the emergence and occurrence of the varying effects of climatic change globally, our environment is now considered a very important resource in making business through appropriate management.

Concepts and perspectives of making business out of the environment and natural resources are described and applied in some cases. Also, it identifies the different influencing factors that build up the business integrity through a workable framework that was developed based on various experiences and researches conducted which were synthesized to develop an environmental business in a changing world. The PCDM environmental framework and model is enhanced by the roles and responsibilities of key actors

utilizing and managing the environmental resource. The strong partnerships of key players and stakeholders through community-based initiatives and appropriate resource management are key results to more productive, profitable and sustainable business ventures in community ecological development and management.

Keyword: enterprising with nature

Plenary Abstract (Upland Nature Studies)

THE NATURE OF PHILIPPINE UPLAND ECOSYSTEM: ITS IMPLICATIONS ON UPLAND AGROECOSYSTEM DEVELOPMENT

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Abstract

Our country's geologic history gave us an archipelago with series of mountain ranges, a chain of 77 volcanoes, surrounded by nine oceanic trenches. Thus, about two-thirds of our total area are uplands with slope greater than 18^0. This geologic feature is coupled with high amount of rainfall and all year-round warm temperature due to our tropical geographic location. Nature's response to this setting is a tropical rainforest in the terrestrial habitat and rich coastal ecosystem composed of mangrove, seagrass and coral reef subsystems.

The tropical rainforest in our uplands is protective, very productive and diverse and yet fragile. Its soil has the tendency to be acidic and infertile primarily due to heavy weathering and leaching as a product of the prevailing warm temperature and heavy rainfall. Much of the nutrients are in the huge biomass of the rainforest biota. Conversion of the tropical rainforest into agricultural lands without the deep knowledge of this nature of the upland ecosystem led to the transformation of the rich tropical forest into impoverished grasslands and open areas which now cover about 12 million has. For our uplands to continue giving us the economic and environmental services that the tropical rainforest has provided us, we need develop an upland agroecosystem that takes into consideration the nature of its soil on the cultural practices and the impact of the interplay of climatic and geologic phenomena on crop and animal production systems. There is a need to conserve biodiversity in the agricultural fields, have continues tree-based vegetation cover on land, adopt science-based, environment friendly technologies and adapt cultivation of crops to climate change.

Keywords: agroecosystem, upland ecosystem,

Plenary Abstract (Interfacing with Nature)

UNBINDING ENVIRONMENTAL INTERFACES

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Abstract

We tend to think of our interactions with nature as taking place in particular, defined times and spaces. Anthropological research has shown that we create boundaries between our selves and our environments in various ways. I will describe this boundary-making in three different contexts: 1) in the design and implementation of nature conservation programs, 2) in the interactions between indigenous peoples and nature-conservationists, and 3) in our responses to so-called "natural" disasters. While recognizing the necessity of drawing such boundaries in the study of nature, I argue that the Cartesian nature-culture divide is no longer tenable, given the ways in which the effluence of human actions spread through nature in an unbounded manner, and the rate at which we are currently eroding the bases of our existence in our environment. I raise questions aimed at drawing out new ways of thinking of interfaces with nature in the social sciences.

Keyword: environmental interfaces

Plenary Abstract (e-Environment)

BIODIVERSITY INFORMATICS FOR FISHERIES MANAGEMENT IN FISHBASE AND SEALIFEBASE

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Abstract

The management of fisheries relies on large datasets treated by mathematical analytical tools since the early stage of the domain. The vulgarization of micro-computers have facilitated the treatment of fisheries data with the development of dedicated standalone softwares. And the successive rises of the Internet and the web have facilitated access to huge amounts of data that were otherwise difficult to get, especially for researchers and managers in developing countries.

FishBase was created in 1990 in ICLARM in the Philippines to facilitate the management of fisheries and is still a living programme: it is now a Biodiversity Information System that consists of databases, websites, and analytical tools on all fishes of the world (ca. 32,000 species). SeaLifeBase is a sister programme started in 2005 with the same goals and informatics infrastructure, but dedicated to the non-

fish marine Metazoa (ca. 105,000 species but with obviously less information per species than in FishBase). Their websites can be consulted at www.fishbase.org and www.sealifebase.org, respectively.

Although the range of aims of FishBase changed since 1990, facilitating the management of fisheries is still one of the main objectives as well as for SeaLifeBase.

Database content and websites will be shortly presented, and three analytical tools will be detailed:
(1) The identification tool set. Managing stocks of fishes and marine invertebrates requires that statistics are gathered at species level, especially for the Ecosystem Approach to Fisheries. Four different types of identification tools are available on the FishBase website:

- 'Eye-balling' drawings and key features by decreasing taxonomic level from class downward;
- Display of all pictures available for a given geographic area or a given family with possible restriction on fin ray meristics;
- Classic dichotomous keys; and
- Uses of simple morphometric ratios.

Some examples of collaboration with the Bureau of Agricultural Statistics to help the statistics collectors on the ground, and with fisherman using the mobile phones will be briefly evocated.
(2) The posters for lengths at first maturity and the subsequent fish rulers. These tools visually indicate the length at first maturity below which fishes should not be caught, otherwise reproduction and replacement of generations cannot occur, leading the sooner or the later to the collapse of the resource. These tools target fishermen, middlemen and customers altogether. In collaboration with the ASEAN Center for Biodiversity, we are developing an interface for managers to customize themselves posters and rulers for their local usage with their own data.
(3) The online life-history tool. Users can compute estimations of a number of biological parameters used in population dynamics analyses such as the length at first maturity for the tools mentioned above, and download various data matrices for modeling purposes. Both these tools and data are at the core of fishery biology, and making them available on the web was a cornerstone for fishery managers in the developing countries, when before, standalone tools and species data were difficult to acquire.
There are other tools but we invite interested colleagues to:
- visit FishBase and SeaLifeBase websites;
- download the FishBase book that explains the data structure, the tools and many theoretical features of FishBase (and SeaLifeBase);
- exploit our online course that makes an ample use of data and tools from FishBase and SeaLifeBase.

Emphasize will be given on the importance to make large datasets available at various scales, stressing the necessity to make data available from the grey literature, to share data and to make them interoperable. These are major obstacles for a fast and comprehensive development of fishery management at national and regional levels. However, the recent facilitation of access to data and tools for fishery management should not hide the fact that the domain is multidisciplinary and complex: the creators of FishBase had great hopes 20 years ago with that "simple" development of information systems such as FishBase. They realized after some experiments and experiences that it is far to be enough. Socio-economy, politics and policies, alternative livelihoods, education, etc. are fully part of the problem and must be addressed at the same time.

Our goal now is more simply to speed up the eco-biological part of the management in order to free time and money to address these other domains and issues, that are often and wrongly independently treated. The ultimate goal is a better management of the natural resources in developing countries, and after all, also in developed countries where fishery management is no better. As medias are starting to report more and more frequently, the survival of this economic sector is already at stake in a medium-term all around the world.

Keywords: biodiversity informatics, ecosystem approach of fisheries, fishbase

Best Paper Entries
Abstracts

EVALUATION OF THE ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES OF *CINNAMOMUM MERCADOI* VIDAL

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Abstract

The leaf and bark methanolic extracts of *Cinnamomum mercadoi* Vidal were evaluated for their antioxidant and antibacterial properties. Antioxidant property was evaluated using the 1,1-diphenyl-2-picrylhydrazyl (DPPH)-radical scavenging activity, ferrous-ion chelating ability and total phenolic content assays. The antibacterial property was determined using Kirby-Bauer method of disc diffusion susceptibility test. Results show that the bark extract has lower IC_{50} (12.7 ± 0.2 µg/mL) for DPPH radical scavenging activity than the leaf extract (91.7 ± 15.7 µg/mL). Moreover, its scavenging activity is comparable to synthetic antioxidant butylated hydroxyanisole (BHA) (23.5 ± 0.5 µg/mL) and better than ascorbic acid (54.5 ± 3.3 µg/mL). High antioxidant activity of the bark is attributed to its higher total phenolic content (1331 ± mg GA/g) as compared to the leaf (216 ± 7 mg GA/g). Both bark and leaf extracts did not show ferrous ion chelating ability. In addition, the bark extract was found to have antibacterial activity against gram-positive bacteria (*Bacillus subtilis* and *Staphylococcus aureus*). The results suggest that *C. mercadoi* can be a potential source of antioxidant and warrant for further antibacterial activity investigation.

Keywords: Scavenging activity, gram-positive bacteria, medicinal plant

SINAMAY WOMEN WEAVERS IN ARGAO AND CARMEN, CEBU

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Abstract

Sinamay is a woven-hemp of abaca used in making many products like; shoes, bags, pouches for international perfumes and others. Many people are engaged in this livelihood in Argao and Carmen, Cebu. The purpose of this study is to assess the livelihood of these people as respondents of the study. The study employed the descriptive survey technique of the research. Thirty seven handicraft entrepreneurs were interviewed.

Age profile revealed that majority of respondents belonged to age bracket 41 and up. All 37 respondents were women. More than 80% had basic education and only 3% reached college. In a span of 10 years in the business, they start their work at 6:30 to 8:00 in the morning, working 7 hours per day and

earn an average of P150.00. About 70% of the respondents have other source of income. Majority of the respondents perceived that their income is enough to support the daily basic needs. It is recommended that they should be given skill and entrepreneurial trainings.

Keywords: sinamay women weavers, abaca, Argao and Carmen

SUCCESS PERCEPTIONS OF THE MICRO DRIED FISH ENTREPRENEURS IN TABOAN MARKET, CEBU, PHILIPPINES

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Abstract

A survey-interview of the micro dried fish entrepreneurs at Taboan Market, Cebu City regarding success indicators and success factors was conducted on July 10, 2008. Ten micro dried fish entrepreneurs were interviewed using the Interview Schedule on "Successful Entrepreneur Interview Survey Form" developed by Dr. Divina M. Edralin, (1998), Manila. All of the respondents were female, 40% belong to ages 18-30, 30% between 51 and above and 10% of them have an age range between 31-40 years old. Seventy per cent (70%) were married, 20% unmarried and 10% widow. Forty per cent (40%) attained high school education, 30% were college level and 30% of them were at elementary level. The success indicators of the enterprise revealed the following: diversification of product, customer satisfaction and continued operation over a long period of time ranks high in the respondents' perception. For the success factors, in the entrepreneurial dimension: diversification of products, customer satisfaction and continued operation over a long period of time which ranks high in the respondents' perception. Verbal communication, technical knowledge of the product and evaluation are the technical skills that contributed to the achievement of their aim. It is recommended that a management training program be designed for micro-dried fish entrepreneurs based on the success perceptions of the respondents.

Keywords: success perceptions, micro dried fish entrepreneur, Taboan market

THE FLOURISHING SMALL-SCALE ENTREPRENEURIAL ACTIVITIES IN STATION 3, BARANGAY MANOK-MANOK, BORACAY, AKLAN

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Abstract

This study investigated the status of various small-scale businesses in Station 3, Barangay Manok-Manok, Boracay. The personal profile of the respondents was described. Most of the respondents were found to engage in ready-to-wear clothing and souvenir items with enough income for family needs during peak season. However, alternative sources of income are very much needed for subsistence during the off season. Another concern is that half of the respondents were not able to send their children to school. The majority of respondents expressed contentment in their livelihood and indicated that their lives have improved due to their entrepreneurship. Implications for implementation of Gender and Development Extension Services include providing the respondents with skills training in other trades that are suitable throughout the off-peak season, allowing the respondents to augment their income and thrive during financial difficulties.

Keywords: small-scale entrepreneurial activities, Boracay, Barangay Manok-Manok

CHALLENGES AND PROSPECTS OF WOMEN SHOEMAKERS IN CARCAR, CEBU, PHILIPPINES

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Abstract

The purpose of this study is to determine the challenges and prospects of women shoemakers in Carcar, Cebu. Specifically the study aimed to: (a) determine the personal profile of women shoemakers in Carcar, Cebu, (b) examine the challenges and prospects that influence the lives of women shoemakers, and (c) identify strategies that would help promote women's economic rights and independence, access to employment and control over economic resources. The descriptive-case study research was utilized in this study in a case-group investigation, focusing on a group of women shoemakers.

Carcar, 40 km south of Cebu City, known as Cebu's Shoe Town has been home to footwear manufacturers. The presence of footwear industry has helped provide employment to Carcaranons as each manufacturer employs between 20 to 70 male and female workers. Women are becoming more important

in not just as workers but also as consumers, entrepreneurs, managers, investors, and owners of business enterprises. Economists believe that if women are provided with equal opportunities, their economic participation will be maximized.

Keywords: Challenges, prospects, shoemakers

THE FLOURISHING BAKASI LIVELIHOOD IN CORDOVA, CEBU

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Abstract

Bakasi is a member of the murarenidae family or known as moray eels as a species known as "Richardson's Moray" (gymnothorax richardsoni). There are over 100 species of moray eels (family murarenidae) in the earth's seas, and in the Philippines, there are over 40 species of Moray eels. Bakasi is abundant in Cordova, which is a 4th class municipality in Cebu. It is situated within Metro Cebu particularly in the Island of Mactan. An interview was conducted to collect data on the profile of people involved in the bakasi livelihood in Cordova. The study revealed that even people in retiring age (51-60 years old) are still involved in this livelihood. More than 80% had basic education while only 8.33 % reached college. Though there is abundance of bakasi in the area, those people involved in the business did not depend on bakasi catching as a livelihood. It was concluded that the income of the Bakasi fishermen is not sufficient to meet their daily needs. It is recommended that livelihood skills training for the Bakasi fishermen and wives should be proposed to maintain their living and to maximize their idle time.

Keywords: bakasi, eels, Cordova

NATURAL WASTEWATER TREATMENT FACILITIES USING FACULTATIVE STABILIZATION POND AND CONSTRUCTED WETLAND FOR LAGUNA DE BAY , PHILIPPINES

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Abstract

Wastewater from the shoreland cities and municipalities of Laguna de Bay is directly discharged to the Bay. Wastewater contains contaminants altering the physical, chemical and biological aspect of receiving body water or discharge area. Thus affordable wastewater treatment facility is needed to lessen if not remove the contaminants from the wastewater. One of the municipalities in the shoreland was chosen as pilot area - the municipality of Paete. In order to determine the type of wastewater treatment facility that will be designed and installed in the municipality of Paete, the socio-demographic, economic and bio physical profile of Paete were properly investigated as well as the characteristics of the wastewater. The Physico-chemical and microbiological parameters of the water from the nine irrigation canals and from the Paete river measured and analyzed were: Turbidity, pH, TDS, DO, temperature, conductivity, salinity, TSS, PSD,TKN, TP,BOD, surfactant, oil & grease, Total and Fecal Coliform. The results of the analysis confirmed the effluent standard for class C, except for oil & grease, and BOD in one site and the Total and Fecal Coliform measured in all sites. The results confirmed the observed scenario in which floating human wastes goes with wastewater. The presence of significant numbers of coliform is evidence that the water is contaminated by fecal material and any pathogens that leave the body through the feces can be present. The excessive amount of oil and grease is an indication of oil pollution which may interfere with the water treatment efficiency. It can interfere with the biological life in the surface of water and create unsightly floating matter and films. Statistical analyses showed significant mean differences of most of the parameters per sampling site and sampling season.

Result showed that flow rate of the wastewater was being altered by the deposition of solid waste in the irrigation canals and in the river. This study revealed that the Natural Wastewater Treatment using Facultative Stabilization Pond and Free Water Surface type of constructed wetland is appropriate in the area. The existing aquatic plants will be utilized as phytoremediators in the constructed wetland. Hence the design of the facilities revealed large area requirement a pilot plant should be constructed first to come up with the established facility specifications as bases for expansion. Appropriation of funds for the pilot project did not materialize early; hence the study was focused only on the pre- construction phase. However, the recommended activities for the construction and operation phase from the original project design were included.

Keywords: wastewater, facultative facilitation, treatment, Laguna de Bay, Paete

GENDER PARTICIPATION IN WASTE RECOVERY AT CEBU CITY SANITARY LANDFILL AND LAPULAPU CITY DUMPSITE

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Abstract

This study investigated the status of the people working as "scavengers" in the sanitary landfill in Barangay Inayawan, Cebu City and the dumpsite in Barangay Mactan, Lapulapu City. Data such as income, involvement of children, additional means of livelihood and other relevant information were gathered from the respondents. Based on the number of respondents, participation in waste recovery was found to be almost equal between the male and female gender. Implications for implementation of Gender and Development programs in the respective communities include medical missions to check on the health of the respondents as well as alternative livelihood skills training.

Keywords: scavengers, sanitary landfill, Gender Participation in Waste Recovery

CEBUANA TRISIKAD DRIVERS: THEIR FANTASIES AND ASPIRATIONS

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Abstract

In Cebu, the word "sikad" means "kick" in English, attributed to the human foot. It is one of the popular short-distance transport vehicles, actually a bicycle fitted with a passenger cab called a sidecar. It had obviously addressed the mobility requirement of the people, delivering cargoes and passengers' right into their doorstep.

A study on the Cebuana trisikad drivers was conducted in Cebu City. Age profile revealed that respondents belonged to age bracket between 34-55 years old, married, with 2-6 children, and whose husbands were trisikad drivers too. They earn Php100.00 – Php200.00 per day especially during Sundays, start the day at 7am and end at 5pm. They became trisikad drivers because husbands cannot remit enough money for the family's needs. They pride in saying that at the time they started to earn for the family, they became empowered and take control over economic resources in the family and became battered wives-no-more.

When asked how it feels to be a trisikad driver, they responded that it's fun, challenging, and rewarding livelihood. They are respected by the male trisikad drivers. They are already contented if they can earn Php100.00 a day to buy NFA rice plus "ginamos" for the family. They enjoy smoking as a way of life. Phrases like: "pinangga ko sa akong bana"; have been uttered by the respondents many times.

It was concluded that trisikad drivers' daily income lies far below the threshold of poverty line. It sends a message to local authorities that their welfare be given attention to give justice to the significance of the services they rendered to the community.

Keywords: Cebuana Trisikad Drivers, short-distance transport vehicles, sidecar

WOMEN JEEPNEY CONDUCTORS IN SELECTED CITIES IN CEBU PROVINCE

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Abstract

This study investigated the status of "Women Jeepney Conductors in Selected Cities in Cebu Province". Essential information such as income, number of dependents, working hours, reasons for working as jeepney conductors and other important facts were gathered from the respondents. Most of the respondents were found to be satisfied with their income but would like to earn more to improve the lives of their family and overcome poverty. They strongly desire to see their children acquire good education and graduate in their chosen course to get a stable and well paying job. Implications for implementation of appropriate Gender and Development Extension Services for the women jeepney conductors include livelihood projects to augment their income and basic training in how to manage their earnings to ensure financial security.

Keywords: Women jeepney conductors, Cebu Province, livelihood projects

WOMEN CANDLE VENDORS AT BASILICA DEL STO. NIÑO DE CEBU, PHILIPPINES

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Abstract

Cebu is renowned as "The Cradle of Christianity in the Far East", the home of the image of the Señor Santo Niño, adored and worshipped by millions of Filipinos and other Catholic faithful worldwide

through candle lighting and Sinulog dancing, among others. Hence, this descriptive study on the women candle vendors and Sinulog dancers at the Basilica del Santo Niño.

Interview responses revealed that their daily average income is PhP200.00 (US $4.34) but would reach PhP500.00 (US $11.00) during Fridays, Sundays and festive seasons, for an average of 4 selling-hours per day. Their main customers are Filipino faithful. Candle vendors' age ranged from 15 to 68. The elderly sold candles for about 20 years while the younger ones at an average of 8 years.

They are breadwinners for families with 5 member—average. Ninety percent claimed that they only take bread for breakfast and could hardly complete three meals a day. Eighty percent revealed that they have to do other chores for a fee, i.e. receiving laundry (60%), selling rags, cigarettes, fish, and vegetables in streets (20%), washing cars (10%). The rest (10%) rely solely on income from candle vending. The vendors continue to sell candles despite their very low income because of their strong faith that Señor Santo Niño will help them overcome their sacrifices.

This study projects the positive image of empowered women candle vendors at Basilica del Santo Niño who make substantial contributions to the economy. It also sends a message everywhere that behind the festive atmosphere of the rich tourists and pilgrims lie the poverty-stricken women-faithful perpetuating the culture of Christianity in Cebu. Tourism councils may assist these vendors so they may live a comfortable life.

Keywords: Basilica del Sto. Niño, Sinulog dancing, candle vendors

INTERACTING SOCIO-ECOLOGICAL FACTORS TOWARDS SUSTAINABLE TRADITIONAL RICE-BASED ECOSYSTEM OF THE KARAO'S*

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Abstract

The study dealt with the comparative and correlative evaluation of farm practices, agro-biodiversity, indigenous knowledge system and perceived threats in three geographically delineated traditional rice-based ecosystems; Station 1 (Sitios Ticop, Peley and Chanom), Station 2 (Sitio Pigingan) and Station 3 (Sitio Deseb) of Karao, Bokod, Benguet. Results revealed a direct relationship of indigenous practices to agro-biodiversity and an inverse relationship to threats. Station 1 have a relatively lower agro-biodiversity, higher perceived threats and fewer indigenous practices. Stations 2 and 3 both have lower perceived threats, higher agro-biodiversity and more indigenous practices. Perceive agro-biodiversity generally showed that Stations 1 and 3 declined from highly diverse in the past 20 years to diverse in the past 10 years. Findings showed that Station 2 had the highest current biodiversity. It was noticed that migration was the major perceived threat to the sustainability of the indigenous rice-based ecosystems. The sustainable rice-based ecosystems

experience a dramatic change due to the continuing intrusion of non-natives weakening the indigenous system and undermining the over-all environmental soundness of the traditional rice-based ecosystem.

Keywords: Agro-biodiversity, socio-cultural system, indigenous practices, threats

ETHNOECOLOGICAL STUDIES OF TREES IN TUEL, TUBLAY, BENGUET

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Abstract

An ethnoecological study of trees was conducted at Barangay Tuel (16°31'60"N, 120°34'60"E), an indigenous community in Tublay, Benguet, purposely to gather and document knowledge of the locals on their existing trees. Specifically, it was aimed to conduct an inventory of the trees and identify those with ethnoecological significance as perceived by the community or locals and to assess the conservation practices on these trees. The two study sites located in small patches of dipterocarp forest in Tuel, Tublay, Benguet have high diversity with regards to tree species as supported by the result of the tree inventory. There were a total of 68 tree species identified in the two sites. Trees reaching to 46 species were identified in Site 1 while 47 tree species were identified in Site 2. "Belete" and "bayabas idoho" were found to be the dominant species in Site 1 and Site 2, respectively. Out of the 68 tree species, the key informant identified 13 species to have ecological significance, 17 species with medical or therapeutic use, 4 trees with cultural significance, 15 species with edible fruits and 32 trees to have miscellaneous uses.

Key words: ethnoecological study, indigenous community, Tublay, Benguet

MOLECULAR DISCRIMINATION OF PHILIPPINE STRAINS OF PADDY STRAW MUSHROOM (*VOLVARIELLA VOLVACEA*)

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Abstract

Genetic diversity study on Philippine paddy straw mushroom (*Volvariella volvacea*) was conducted. Fourteen commercial strains of *Volvariella volvacea* were collected from different areas of the Philippines: Central,

Northern and Southern Luzon and the Visayas region. Eight strains were from small scale producers and 6 strains from research institutes. Forty one wild strains on the other hand, were collected from different geographical areas in Northern and Central Luzon region. Strains were differentiated using random amplified polymorphic DNA (RAPD).

A single 10-based primer was used to generate randomly amplified polymorphic DNA (RAPD) in *Volvariella volvacea* and differences were noted in band size (bp) ranging from 1800bp to 550 bp. Principal component analysis (PCA) of the RAPD data revealed six strain groups from commercial and wild strains. Six strains showed the same RAPD pattern with band appearance at 1800; 950; 850 and 750bp; 3 strains at 1800; 750 bp; 3 strains at 1800, 950, 850 and 550 bp and the most abundant group with 34 strains at 750 bp. One strain exhibited RAPD pattern at 1750, 950 and 750 bp and 8 strains manifested band appearance at 1500, and 550bp. Diversity measures reveal divergence value from equiprobability (D_1) of 0.7799 or D_1%, 38.9959 among wild population. This is a substantial divergence from equiprobability and the diversity can be considered low. With observed lack of heterogeneity among strains, it is recommended that more collections from the wild should be undertaken for more diverse germplasm collection. Moreover, it is suggested that RAPD can be used to delineate strains of *Volvariella volvacea* with potential importance on genetic diversity conservation and breeding.

Keywords: *Volvariella volvacea;* Genetic diversity; Random amplified polymorphic DNA

SAVING THE IFUGAO RICE TERRACES FROM GIANT EARTHWORMS (*PHERETIMA ELONGATA*): THE USE OF *HARPULIA ARBOREA* BARK AS ORGANIC VERMICIDE

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Abstract

An experiment following the complete randomized design (CRD) research design in three replicates was conducted under laboratory and field conditions to determine the effect of Uas (*Harpulia arborea* (Blanco) Radlk.) bark in controlling giant earthworm (*Pheretima elongata*) destroying the world-famous rice terraces in Ifugao. Treatments were dosages of pounded fresh Uas bark. The time it takes the dosage to cause mortality to the giant earthworm was observed.

Under laboratory condition, results indicate significant differences on the time it takes to control giant earthworms. The 100 grams concentration gave the shortest time to effectively control giant earthworm at 39 minutes while the 25 grams dosage gave the longest at 93 minutes. Results revealed that the higher the concentration, the shorter the time it takes giant earthworms to get eradicated.

Under field condition, results revealed that Uas bark is very effective in eradicating giant earthworms. Higher concentration gave shorter time (2 hours) to cause giant earthworms to come out from their holes. Lower concentrations were equally effective but it took longer time to cause mortality to giant earthworms.

The study suggests that Uas bark is a very effective organic and environment-friendly botanical vermicide for the control of giant earthworm in the Ifugao Rice Terraces.

Keywords: Organic Vermicide, *Harpulia arborea*, *Pheretima elongata* (Giant Earthworm), Control Measure

ANTIOXIDANT POTENTIAL OF SELECTED INDIGENOUS FRUITS USING *IN VITRO* LIPID PEROXIDATION ASSAY

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Abstract

This study was primarily concerned in determining the antioxidant potential of the edible parts of selected indigenous fruits grown in Cordillera namely ayosep (*Vaccinium angustifolium*), bitungol (*Flacourtia indica*), kalamondin (*Citrofortunella microcarpa*), marble tomato (*Lycopersicon pimpinellifolium),* native lacatan (*Musa paradisiaca*), native passion fruit (*Passiflora edulis*), pinit (*Rubus copelandii),* rattan (*Calamus mollis),* tamarillo (*Cyphomandra betacea) and* tumok (*Musa troglodytarum)* as compared to Vitamin E, the standard used in the study. Antioxidant potential of the extracts was tested and measured using *In Vitro* Lipid Peroxidation Assay as indicated by absorbance value in mAU and % Lipid Peroxidation Inhibition. Based on this test, all the fruits exhibited lower absorbance values and higher % of lipid peroxidation inhibition as compared to the positive control which signifies that the fruits exhibited greater antioxidant potential. All values were recorded and treated statistically using one way ANOVA (Analysis of Variance). Among all the fruits studied, native passion fruit and rattan exhibited the greatest antioxidant potential and therefore, ranked 1. Followed by ayosep, kalamondin and pinit at Rank 2.This result provides new information on the antioxidant potential of fruits such as native passion fruit (Passifloraceae) and rattan (Arecaceae) that is, they possess higher antioxidant potential than vaccinium, rubus and citrus fruits which are well known to possess high antioxidant activity. Among all the fruit samples, marble tomato (Solanaceae) had the lowest antioxidant potential and % of lipid peroxidation inhibition followed by native lacatan and tumok (Musaceae). Furthermore, the presence of the following bioactive phytochemicals such as alkaloids, steroids, polyphenols, flavonoids and tannins are responsible for the antioxidant potential of the fruits.

Keywords: Absorbance Value, Antioxidant Potential, Indigenous Fruits, *In vitro* Lipid Peroxidation Assay, Natural Antioxidants

GEOGRAPHIC VARIATION IN THE SHELL SHAPE OF FRESHWATER BIVALVES FROM CAGAYAN DE ORO RIVER, MINDANAO, PHILIPPINES

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Abstract

Edible bivalves (*Corbicula* species), present in some areas along Cagayan de Oro River, come in various sizes, colors and shapes. Quarrying at the upstream and midstream sites have been observed to cause the decline in bivalve population. A total of 270 bivalves were collected by convenient sampling along a 10-meter transect line used in each of the three sites (upstream, midstream and downstream) for three sampling periods. The shells of the samples from the downstream site are large and have coarse texture compared to those from the upstream and midstream sites. The length and width of the left and right valves were measured using Image Tool software, as extracted from the digitized images of the bivalves. The data were then compared using Box Plot and One-way Analysis of Variance (ANOVA) using the Paleontological Statistics (PAST) software. Differences were observed between the left and right shells but one-way ANOVA of the data, however, show not significant results (p value > 0.05). In this study, the physicochemical parameters in terms of temperature (°C), salinity (ppt), pH, electric conductivity (µS), percent grain size, and volume of flow (m^3/s) were measured along the three sites of the river. Tukey pairwise comparison gives significant results for salinity, electric conductivity and volume of flow (p value < 0.05).

Geometric morphometrics of the shell shape was done through outline analysis using the SHAPE software. The multivariate data sets from the image analysis using Elliptic Fourier descriptors were compared using the Principal Component Analysis (PCA) and Cluster Analysis (CA). PCA results show that bivalves collected from the midstream and downstream sites have distinctive shell shapes, but those from the upstream site show overlapping results with those from the other two sampling sites. CA results, however, show that the shell shape of bivalves collected from upstream and midstream sites are grouped in the same cluster, while those from downstream area form a separate group. The geographic variation in shell shape could be brought about by the differences in the physicochemical parameters. Conservation and management issues concerning these bivalves must be taken into consideration in order to protect and sustain the population.

Keywords: bivalves, shell shape, outline analysis, Elliptic Fourier Analysis

FROM NUMBERS TO NATURE

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Abstract

How can teachers incorporate the concept of nature and environment to a hard science course, particularly Mathematics? True enough, there are existing mathematical tools such as Differential Equations, Monte Carlo Simulations, and Mathematical Programming that can be applied to real-world environmental problems. However, these tools are quite advanced to be fully understood by young

students. With this difficulty, finding a suitable method becomes the new challenge for educators and mathematicians alike. Traditionally, geometrical structures can represent various figures, but surprisingly, polynomials can also be an effective tool. Teachers just need to be innovative and create a fun activity to connect nature with algebraic concepts such as polynomials.

In this paper, mathematical concepts in high school such as polynomials, Pascal's triangle and Cartesian coordinate system, which are too technical for most students, are given a new application. Nature-inspired art, specifically paintings, can be created by students without using pen, ink and paper. Students need only mathematical concepts and basic knowledge on computers to carry out this activity. In this activity, students are to use polynomial equations and MS Excel to draw the outlines, and equations of a line and Paint to color the image. As an example, a nature-inspired drawing highlighting Mariang Makiling is presented.

Keywords: Bezier curves, polynomials, math, art, equation of a line, colors, e-Environment

INCREASE IN FEMALENESS IN THE SEX EXPRESSION OF *JATROPHA CURCAS* L. AS AN EFFECT OF ETHREL TREATMENT

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Abstract

Jatropha curcas L. (Euphorbiaceae) is a monoecious and protandrous shrub with an average male-to-female flower ratio of 29:1. The possibility of decreasing this floral ratio of *J. curcas* by increasing the production of pistillate flowers was explored in this study. A boost in the production of pistillate flowers can result to an increase in fruit production and is thus favorable to crop yield. Since ethylene is a plant hormone which was found to induce a shift in sex expression towards femaleness in many plants, the effect of ethylene on the flowering physiology of *J. curcas* was studied using three concentrations of the growth regulator Ethrel. Results of this study revealed that the lowest concentration (333 ppm) was most effective in manipulating the sex expression of *J. curcas* into a rate more favorable for higher crop yield. This concentration was also effective in increasing its fruit production whereas higher concentration resulted in increased number of aborted fruits.

Keywords: Jathropha Curcas L., ethrel treatment

PROFILE, PRACTICES AND POTENTIALS OF WILD HONEY GATHERERS

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Abstract

Bohol is one of the leading provinces in the Philippines that give priority to environmental rehabilitation and biodiversity conservation. Several stakeholders are engaged in different levels of program implementation. Wild honey bees (WHB) are very important in the biodiversity and conservation of the forests. In Bohol Apis Dorsata or "Putyukan" found in heavily forested areas produce huge supply of honey. Residents along forest lines have been harvesting wild honey for economic value. Their number has not been accounted for nor their practices documented. The study aimed to provide information about wild honey gatherers known as *mamuhagay* in two barangays in Bilar, Bohol. Specifically it determined the socio-economic profile of *mamuhagays,* manner of harvesting, economic value of wild honey, potentials and issues related to wild honey gathering.

The study found out that m*amuhagays* are rural poor who augment their income by harvesting wild honey. The job requires no capital, only skill and hard labor. It exposes the gatherers to risks and dangers. The lure of immediate income that it could bring at the end of the day has been their incentive. Almost half of them had been harvesting in the last five years while one-fourth had been in the trade for ten years. The income from wild honey comprised almost a fifth of their total annual income. The peak season for honey gathering is March to April. Among the issues identified were: 1. High disparity in pricing between wild honey (Php 60 per 375 ml bottle) and processed cultured honey (Php 250.00 per 200 ml). This could be the basis to the possibility of establishing a wild honey cottage industry. 2. *Mamuhagays* leave bees wax to rot in the forest floors which could be sold and utilized as honey by-products.3. Wild honey gathering could be linked to the ecological tourism industry in the province. 4. Organized wild honey gatherers realized the important link of WHB to forest protection because it has become their source of livelihood. 5. Lack of knowledge and information on parameters of WHB population may cause over extraction leading to their extinction. Recommendations: 1. Conduct feasibility study on wild honey cottage industry. 2. Initiate pilot testing of an ecological tour package on wild honey gathering 3. Study the key demographic parameters of WHB population to determine rate of sustainable harvesting.

Key words: Wild honeybees, wild honey harvesting, wild honey

FOREST FRAGMENTATION IN CENTRAL CEBU AND ITS POTENTIAL CAUSES: A LANDSCAPE ECOLOGICAL APPROACH

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Abstract

Forest fragmentation has been a pressing issue in the environment especially with its contribution to climate change. The study analyzes the forest fragmentation in Central Cebu by using GIS and thematic maps developed for the Central Cebu Protected Landscape. The analysis utilized three landscape indices, namely: patch number (PN), mean patch size (MPS), and mean shape index (MSI).

Data analysis shows that the remaining forests in the study site are highly fragmented. This is indicated by the bigger number of smaller forest fragments with areas less than 20 has (PN = 37) than larger fragments (MPS > 81 has) and bigger MSI values of larger fragments. All forest patches in the area have convoluted or elongated shape, which is more prominent in larger fragments than in smaller fragments. Among the identified causes for this pattern are agricultural activities such as the production of annual and perennial crops. It is probable that forests are converted into agricultural lands for this purpose.

Patch shape elongation and production of annual crops necessitate the implementation of a management strategy that can address edge effect, and manage regular disturbance from agricultural areas.

Keywords: forest, fragmentation, GIS, Cebu, landscape, ecology

EVALUATION OF THE ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES OF *CINNAMOMUM MERCADOI* VIDAL

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Abstract

The leaf and bark methanolic extracts of *Cinnamomum mercadoi* Vidal were evaluated for their antioxidant and antibacterial properties. Antioxidant property was evaluated using the 1,1-diphenyl-2-picrylhydrazyl (DPPH)-radical scavenging activity, ferrous-ion chelating ability and total phenolic content assays. The antibacterial property was determined using Kirby-Bauer method of disc diffusion susceptibility test. Results show that the bark extract has lower IC_{50} (12.7 $\pm$ 0.2 µg/mL) for DPPH radical scavenging activity than the leaf extract (91.7 $\pm$ 15.7 µg/mL). Moreover, its scavenging activity is comparable to synthetic antioxidant butylated hydroxyanisole (BHA) (23.5 $\pm$ 0.5 µg/mL) and better than ascorbic acid (54.5 $\pm$ 3.3 µg/mL). High antioxidant activity of the bark is attributed to its higher total phenolic content

(1331 ± mg GA/g) as compared to the leaf (216 ± 7 mg GA/g). Both bark and leaf extracts did not show ferrous ion chelating ability. In addition, the bark extract was found to have antibacterial activity against gram-positive bacteria (*Bacillus subtilis* and *Staphylococcus aureus*). The results suggest that *C. mercadoi* can be a potential source of antioxidant and warrant for further antibacterial activity investigation.

Keywords: scavenging activity, gram-positive bacteria, medicinal plant

DETERMINATION OF THE OPTIMAL LAND AREA FOR ESTABLISHING BIOFUEL PLANTATIONS USING MIXED INTEGER GOAL PROGRAMMING: THE ISSUE OF FOOD VERSUS FUEL IN THE PHILIPPINES

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Abstract

Most people depend on petroleum products for a variety of reasons; cooking and transportation just to name a few. These fossil fuels increase the amount of greenhouse gases like carbon dioxide in the atmosphere, thereby aggravating the effects of global warming. In addition, the rising global temperature increases humidity or the amount of water vapor in the air, another greenhouse gas that has twice the effect of carbon dioxide, which amplifies global warming. This is the so called feedback effect.

Not only are petrol products harmful to the environment, but the increasing world prices of fossil fuels such as liquefied petroleum gas (LPG) does not make petroleum products very viable for consumption of a developing country like the Philippines. Because of the energy crisis we are facing, the Philippine government focused its attention on the development of alternative sources of fuel, which are the biofuels. However, the promising income of the biofuel industry encourages the participation of private investors, thereby decreasing the area of land used in food production. Thus the need for determining the amount of land to be allocated for food and fuel production arises. This paper aims to determine the amount of land to be used in establishing biofuel plantations such that the food production does not decline. In this paper, a model for determining the amount of land to be used in food production versus biofuel plantations using mixed integer goal programming was developed. Several factors were included such as demand for major agricrops, importation of agricrops, area of cultivated and uncultivated land in a particular location, suitability and preference of people in a location for agicultural crops and biodiesel plantations, and production of major agricrops per unit area of land.

Keywords: biodiesel, biofuel, alternative energy, global warming, climate change, plantation, Agriculture, agricrops, food production, goal programming

POLICY ALTERNATIVES ON HOUSEHOLD SOLID WASTE MANAGEMENT IN MANDAUE CITY, PHILIPPINES: BASED ON THE JAPAN EXPERIENCE

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Abstract

The study's concept is to develop policy alternatives for the household sector of Mandaue City, Philippines with regards to solid waste management. The household sector was the focus of the study since it is believed that the community is not only one of the major sources of solid wastes but, when properly managed can aid in minimizing the turnover of solid wastes, ultimately reducing pollution. The Japan experience in curbing environmental pollution is taken into consideration. A historical account was done starting from the time of rapid economic growth until the current state of environment. An analysis on the strengths and weaknesses of Japan's efforts is done to serve as point factors in developing an SWM model for Mandaue City.

Data indicated more female than males, most are aged from 30 to 53 years old with some or full tertiary education. Majority of the households has 4-6 members and lived in concrete or concrete and wood houses that were rented and/or constructed on rented lots. Roughly 60 % have low to average income levels ranging from five thousand to eleven thousand pesos. Ninety one percent was aware of ordinances related to solid waste management, however, more than 50% do not practice segregation and more than 3/4 do not compost their kitchen wastes. Around 90% support the construction of an incinerator however; they want its construction away from the community. Household income has a significant effect on the respondent's willingness to pay garbage fees. Furthermore, the level of education did not have a significant effect on waste management practices, specifically composting and segregation. Since everybody is an active participant in solid waste generation, full enforcement and implementation of SWM projects, therefore must be a collaborative effort of the government, the private sector, the industries, the civil societies and the community.

Keywords: solid waste management, household sector, policy, collaborative effort, urbanization and industrialization

AYTA MAGBUKON SCHOOL OF LIVING TRADITIONS: A STRATEGY TOWARDS THE PRESERVATION OF INDIGENOUS CULTURE OF BATAAN

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Abstract

The UNESCO declares that there are two approaches to preserve cultural heritage: one is to record it in tangible form and conserve it in an archive; the other is to preserve it in a living form by ensuring its transmission to the next generations. The establishment of School of Living Traditions (SLT) is in response to the second approach. While there are various facets of cultural heritage that can be transmitted to the next generations, this undertaking would like to specifically focus on the transmission of indigenous skills

and techniques to the young. It aims to encourage culture specialists/masters to continue with their own work, develop and expand the frontiers of that work, and train younger people to take place in the future.

The establishment of SLTs is also anchored on the mandate of the National Commission for Culture and the Arts (NCCA) and one of the thrust of the Bataan Peninsula State University (BPSU) to be the leading agency in the province in the preservation of tradition, culture and historical heritage of the province. Twenty five (25) Ayta Magbukon students enrolled at BPSU ages 12-19 years old have undergone training on chanting, traditional cooking, songs, and dances under the tutelage of six (6) Cultural Masters. Knowledge of the different traditional medicinal plant used by the Ayta Magbukon was also incorporated in this program as the researcher found it significant because this is also part of their culture and indigenous skill.

All indigenous skills and knowledge taught and shared by the cultural masters were properly documented for wide dissemination to the Ayta Magbukon community. Likewise, it will serve as reference to researchers, academe, scholars, students and concerned individuals who will investigate the Magbukon culture and traditions that may help in preserving the culture and traditions of these minorities. Although there are government agencies and local government units that already stepped on ahead in preserving the culture and traditions of the minorities, yet there are still many paths and facts unthreaded about the existence and well being of these people. Through this program, they will be more aware of the life of our Ayta brothers and would somehow intensify their interest and multiply their support on preserving the heritage of these indigenous people.

Keywords: ayta, indigenous, magbukon culture

PEOPLE-FOREST INTERACTION IN IBUSI-TALAKAIGAN WATERSHED, PALAWAN ISLAND, PHILIPPINES: ITS ENVIRONMENTAL IMPLICATIONS

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Abstract

The dynamics of human-forest interaction in Ibusi-Talakaigan watershed, Aborlan, Palawan was determined by doing social and literature surveys and by using the STELLA program for model development. The direct users of the forest were poor Indigenous Peoples and migrants. Income, family size, education and size of cultivated farm significantly influenced the harvest frequency of forest products.

Using current data and trends to extrapolate conditions over the next 50 years, the simulation showed that the Ibusi-Talakaigan watershed would become less and less sustainable in ecological and socioeconomic terms. The model projected that forest cover declines at 3 ha/year. The best way to sustainably management the Ibusi-Talakaigan watershed is by increasing people's income, reducing the population of forest dependents and increasing reforestation efforts especially for rattan species and almaciga trees. For immediate protection, the area must be upgraded from a Controlled Use Zone to Core Zone but declaring it into a Protected Area under NIPAS law ensures its long term sustainability.

Keywords: Ibusi-Talakaigan watershed, Indigenous Peoples, migrants, model simulation

DETERMINATION OF ANTIBIOTIC RESISTANT BACTERIA AND MERCURY RESISTANT BACTERIA FOUND IN DENTAL AMALGAM IN ILIGAN CITY

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Abstract

Genes encoding resistance to mercury and to antibiotics are often carried on the same mobile genetic element and so it is possible that mercury-containing dental materials may select for bacteria resistant to mercury and to antibiotics. The main aim of this study was to isolate and identify Mercury-resistant bacteria and antibiotic resistant bacteria. Another aim is to determine whether the Hg-resistant isolates were also antibiotic resistant and to estimate the frequency of isolation of mercury and antibiotic-resistant bacteria in oral flora in Iligan city. Twenty four Bacterial isolates from saliva samples of healthy contributors with amalgam fillings were screened for mercury resistance and antibiotic resistance by cultivation on an $HgCl_2$-containing medium and medium without $HgCl_2$. Surviving organisms were identified and their susceptibility to mercury and to several antibiotics was determined. Biochemical test and gram staining was employed to further identify the isolates. 8.33% was presumptively identified as *Streptococcus pyogenes*, another 8.33% was presumptively identified as *Staphylococcus spp.*, 12.5 % was presumptively identified as *Escherichia coli*, 29.17% was also presumptively identified as *Streptococcus pneumonia* and finally 41.67 was presumptively identified as *Enterobacteriaceae spp.* .

One hundred percent of the twenty four isolates in the Hg-containing medium and medium without Hg-content harbored Hg-resistant bacteria; this difference was not statistically significant. However, there was a significant difference between the groups in terms of the proportions of Hg-resistant bacteria and antibiotic resistant bacteria in the oral microflora of the isolates. The results of this study show that there was a significant difference between the isolates with amalgam fillings with regard to the prevalence, or the prevalence of Hg-resistant bacteria and antibiotic resistant bacteria in their oral microflora. The study also found that mercury-containing dental materials may select for bacteria resistant to mercury and to antibiotics.

Keywords: Mercury resistance, antibiotic resistance, microflora

INVENTORY OF FLORA AND FAUNA IN THE WESTERN SLOPE OF MT. ARAYAT

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Abstract

The flora and fauna of the Western Slope of Mt. Arayat was surveyed from August to November 2009, study sites were established using the Fixed Area Cluster Method at an altitude 380 to 480 m above sea level. One station was composed of five sub-plots. Each station has a dimension of 400m and is situated 150 m away from the next station. Three stations were considered in the study.

There were three species of orchids recorded namely: *Trichoglottis latisepala, Dendrobium sp.* and *Vanda teres*. *Trichoglottis latisepala* had the highest frequency value of 0.87 and found to be the most dominant orchid species in the study site. Dendrobium sp. was recorded with the least frequency of 0.67 and the least dominant species (Do=0.06). Only one species of bamboo- *Bambusa merrilliana* was recorded from the study site and four species were recorded for palm. *Calamus sp1* was the most widely distributed and highest in terms of population indices while *Arenga pinnata (Wurmb) Merr* was the least distributed. Among the vine species, *Bauhinia integrifolia* was the most widely distributed and recorded with the highest number of species and *Pothos hermaphroditus* is least distributed. Only one fauna group, the butterfly was inventoried in the study sites composing of 17 species which varied in their morphological characteristics. *Nacaduba subperusa* had the highest frequency (F=1), a species not recorded in the 2000 inventory at the northwestern slope of Mt. Arayat by Bagunu *et al.* (2004) but *Gandaca harina* registered the highest percentage of occurrence among the stations under study. *Hypolimnas bolina bolina* is the most dominant (Do=9.28).

Keywords: biodiversity, inventory of flora, inventory of fauna, conservation

CYTOGENETIC ANALYSIS OF NILE TILAPIA (*OREOCHROMIS NILOTICUS*) IN SELECTED AREAS OF CANDABA SWAMP AND PAMPANGA RIVER

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Abstract

Occurrences of chromosomal aberrations and micronucleated gill cells in Nile tilapia collected from different sites of Candaba Swamp and Pampanga River was documented from October to February 2010. A total of 24 Nile tilapia samples were used in the study, six samples (3 males and 3 females) in each

station. The four different sampling stations were the following: Station 1- Sulipan River, Apalit, Pampanga, Station 2- Danga River, Macabebe Pampanga, Station 3- San Agustin Swamp, Candaba Pampanga, Station 4- Dukma River Extension, Candaba Pampanga. In each station, 3 male and 3 female Nile tilapia samples were collected and subjected to cytogenetic analysis. Chromosome analysis was done to establish the occurrence of ring chromosome, fused chromosome, dicentric chromosome, sticky chromosome, and desperalized chromosome at the C- metaphase stage. The micronucleated gill cells were observed at the interphase stage.

Cytogenetic analysis revealed that there were observable occurrences of abnormal chromosomes exemplified by ring formation, fusion, dicentricity, stickiness, and desperalization. Chromosomal abnormality was observed in 79 % (19/24) of the fish samples under study. Fifty percent (50%) of the chromosomal abnormality observed were ring chromosomes; 22% were sticky chromosomes; 11% were dicentrics; 4% were fused and 13% were desperalized chromosomes.

The percentage occurrence of fishes with two or more abnormal chromosomes, which is beyond the acceptable limit of 0-2 is 100% in Station 1 for both males and females, 67% occurrence for both males and females in Station 2, 67% occurrence for males and 100% occurrence for females in Station 3, and no occurrence in Station 4.

Fishes from all the stations under study were detected with micronucleated gill cells with the highest number observed from the Nile tilapia of Station 1 with 289, followed by station 3 with 139, and 136 micronucleated gill cells in Station 2. The lowest number was observed in Station 4 having 56 micronucleated gill cells.

Keywords: cytogenetics, chromosomal abnormality, c-metaphase, micronucleated gill cells

STATISTICAL AND HYDROLOGIC FREQUENCY ANALYSIS OF RAINFALL IN NORTHERN MINDANAO

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Abstract

This study was conducted to determine types of rainfall based on rate per precipitation, look into the highest seasonal percentage (%) variation, the trend analysis equation, probability of occurrence as well as the recurrence interval time based on computed probability. The study accounted the annual time series rainfall of Northern Mindanao, Region X in the last thirty (30) years (1979-2008) obtained from Philippine Atmospheric Geophysical and Astronomical Services Administration (PAG-ASA X Station), Cagayan de Oro City.

Results revealed that in the last 30 years, there is an increase occurrence of moderate, heavy, very heavy, and extreme types of rain. For moderate rain there was a 60% increase occurrence; 200% increase occurrence for heavy rain; 5.6% increase occurrence for very heavy rain and 12.94% increase occurrence for extreme rain. This suggests there are more runoff incidents to be expected in the coming years which would eventually cause more flashfloods in the region.

It was observed that from 1979-1988, the actual rainfall exceeded more than 400mm^3 than the expected normal rainfall with the highest seasonal % variation ranging between 10-15%. The trend equation defined a positive trend. The succeeding 10 years, 1989-1998 showed greater rainfall 500mm^3 in the actual curve with the highest seasonal % variation ranging between 15-20%. It has a positive trend equation with an increment of 16.5. The last ten years, 1999- 2008 showed the highest trend equation with

a factor of 20 with actual rainfall exceeded more than 300mm[3]. This means that rainfall trend has increased twenty more in the last ten years. It has the highest seasonal % variation ranging between 10-15%.

Generally, the hydrologic frequency analysis result revealed that the three (3) decade maximum rainfall has a recurrence interval of 31 years with a probability 0.03 (3.23%). Its lowest maximum rainfall has a recurrence interval of 1 year with probability 0.97 (96.77%). However, it was noted that both most and least maximum rainfall in thirty years is classified as extreme rain. This further suggests that possible run offs will occur in the coming years. Therefore, it is strongly recommended that the concerned local government unit will take precautionary measures in order to prevent catastrophic damages within the region. Since this area is located with coastal vicinities, intensive environmental protections shall be made.

Keywords: rainfall, hydrologic frequency, Northern Mindanao

THE UTILIZATION OF *COLOCASIA ESCULENTA* (GABI) LEAVES AS A POTENTIAL OIL SPILL ABSORBENT

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Abstract

The study was conducted to evaluate the oil absorbing ability, oil holding capacity and the reusability of *Colocasia esculenta* (gabi) leaves and its potential in oil spill cleanup. The study was laid out in a Complete Randomized Design with five treatments replicated three times namely; T_0 (water), T_1 (kerosene), T_2 (diesel oil), T_3 (gasoline), T_4 (cooking oil). The absorbent materials were leaves of *Colocasia esculenta* (Gabi). The leaves were removed from its stem and chopped its leaves into small pieces and placed in a five 6x12cm pouches. Data were gathered and analyzed using mean, One-way ANOVA and Post-Hoc Analysis by Duncan's test. Results showed that *Colocasia esculenta* leaves have a low water pickup and high oil pickup ability, high oil holding capacity that it can absorb and hold oil two to almost four times of its own mass. This is due to its hydrophobic, lipophilic and oleophilic properties. Data also showed that it can be reused both in lighter and high viscous, sticky and persistent oil. Within the limits of the study, *Colocasia esculenta* leaves are another potential absorbent material that can be used to cleanup oil spills along the coastal areas and its can used to recover valuable oils. Nevertheless, it is recommended that on site study must be done to establish its potential to remove oil spills and to recover valuable oils.

Keywords: *Colocasia esculenta* absorbent

FLORISTIC COMPOSITION AND PHYSIOGNOMY OF PAGBILAO MANGROVE, QUEZON PROVINCE

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Abstract

The plant species composition, physiognomy and importance value were determined in Pagbilao mangrove were determined from May 2009 to August 2010. Vegetation analysis was done within a 20x20m quadrat established in each of the landward, middleward and seaward zones. A total of 37 species were identified in all zones. It is composed of 744 individuals belonging to 28 genera and 18 families. The seaward, middleward and landward zones consisted of 20, 7 and 29 species respectively. Using Shannon Index of diversity, the landward zone has the highest diversity followed by the seaward zone. The least diverse is the middleward zone. There is a similar trend in the proportion of various tree heights and diameter in seaward, middleward and landward zones. The density of small trees is higher than those of the big ones. The IV of the species varied within the zones. In the order of decreasing IV *A. marina* > *A. floridum* > *Sonneratia alba* in seaward zone. In the middleward zone, *A. officinalis* > *C. decandra* > *S. hydrophyllacea*. At the landward zone, X. *granatum* > *A. officinalis* > *R. mucronata* > *A. marina var. rumphiana*.

Keywords: Mangrove, Species composition, physiognomy, importance value

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SURVEY OF WILD ANIMAL SPECIES SOLD IN THE PUBLIC MARKETS OF TABUK

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Abstract

Natural resources including wildlife that provides the basic needs and source of income among the indigenous communities still abound in the province of Kalinga. A survey was conducted to identify, determine the number, and photo-document the animal species sold in public markets of Tabuk City. Results of the survey showed that there was a total of 35 wild animal species sold in the public markets of Tabuk City. These animals include wild fish, mollusk and crustacean species that were gathered from freshwater habitats such as the main Chico River and its rivulets, streams, creeks, lagoons, and ponds, and rice fields along the floodplains. The availability of these animals in the market showed seasonal variations. These animals were sold primarily as food. However, the selling of immature wildlife such as fingerlings may threaten these species. It may also indicate the lack of ecological awareness of the indigenous vendors.

Keywords: wild animal species, cash income, public markets

THE ROLE OF WOMEN IN SMALL-SCALE INFORMAL TRADE CENTERS OF HANDICRAFT INDUSTRY IN CEBU, PHILIPPINES

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Abstract

A survey-interview on the role of women in small-scale informal trade centers of the handicraft industry in Cebu, Philippines was conducted on April 28-30, 2008. Twenty handicraft entrepreneurs specializing in "borloloy" making were interviewed using the Interview Schedule on "Successful Entrepreneur Interview Survey Form" developed by Dr. Divina M. Edralin, (1998), Manila. Of the twenty respondents, 75% were women whose ages ranged from 40-60 years old, 75% were married with two to three dependents, and 50% were high school graduates. Eighty-five percent were members of the handicraft association. The industry is a family enterprise and being headed by the eldest in the family, obliged them to continue the enterprise which was started by their parents. The success indicators of the enterprise are the following: continued patronage due to customer satisfaction, diversification of products, continued operation of business over a long period of time and optimum profit. The success factors revealed the qualities of the respondents: self confidence, hardworking, industrious, thrifty, responsible, innovative, good in verbal communication, organizing, evaluating, opportunity-seekers, have good customer relationship, strategic location of the business, good supplier relationship, and availability of raw material,

and the like. The external factors which contributed to the success of the enterprise are the following: family serves as early training for self-reliance and independence; presence of telecommunications, abundance of resources and peace and order in the community.

Keywords: small-scale, informal, handicraft, raw material, opportunity-seekers, borloloy

AGROFORESTRY FOR LIFE: ITS ENVIRONMENTAL CONTRIBUTION IN CLIMATE CHANGE MITIGATION IN KALINGA PROVINCE, PHILIPPINES

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Abstract

Agroforestry as a practice in Kalinga Province is a tradition that passed from generations to generations and became a way of life to the people of Kalinga. Various agroforestry systems in Kalinga province evidently contributed to the household economy of the farmers while indirectly contributing to forest cover restoration and in mitigating global climate change. The Agroforestry farming systems in Kalinga represent various crop combinations of farm enterprise, cropping system, livestock, fisheries, forestry, poultry and the resources available to the farmer to raise them for food and for profit. The traditional multistory agroforestry farming system noted to be the most widely adopted agroforestry farming systems in the province of Kalinga with various crop combinations and it diverge from farms of the tribes, and the location of the farm as to aspect and altitude. The upper canopy is composed of light-demanding species and the lower strata composed of diverse agronomic crops that provide food for the day-to-day needs of the people with an average diversity index ranging from 0.88 to 0.118 and from 0.97 to 0.33 respectively. Agroforestry system is a potential carbon sink that absorb CO_2 and has the capacity to accumulate carbon and release oxygen. The investigation showed that carbon storage ranged from 16.42 to 52.88 MgC/ha and it varied from site, altitudinal zonation and crop diversity.

Keywords: traditional multistory agroforestry system, diversity, carbon stock, carbon storage, carbon sink, altitude

COMMUNITY RESPONSE TOWARDS TOXIC AND HAZARDOUS SUBSTANCES: THE BULACAN, PHILIPPINES EXPERIENCE

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Abstract

Meycauyan City and Marilao both in Bulacan, Philippines were listed as two of the most polluted cities in the developing world due to the industrial waste haphazardly dumped into the Meycauayan, Marilao and Obando River (Blacksmith Institute, 2007). For many years now, these two towns are the hub for beautiful jewelries and fine leather. The gold smelting and leather tanneries industries however, are believed to have contributed much to the heavy pollution of the river. Thus, this study was conducted to determine the knowledge, attitude and perception of the people in Meycauayan and Marilao towards toxic and hazardous substances present in their respective communities.

A survey using a structured interview schedule was conducted to gather the data for the study. Respondents were chosen through purposive sampling from nine (9) barangays of the two municipalities. The sample barangays were chosen to represent three main industries to which toxic materials pollution is attributed. Results showed that the respondents are aware of the hazards the toxic substances used in gold smelting, leather tanning and lead recycling. Many of the respondents attribute the diseases they suffer like skin diseases, coughs and cold, lung problems and others, to exposure to toxic chemicals and fumes from the industries mentioned. However, respondents from barangays chosen to represent gold smelting, have attitudes toward gold smelting reflecting undecidedness since they also recognized the economic contribution of the industry in the area. The same results were found in the attitudes toward leather tanning of respondents from barangays chosen to represent tanning industries. Respondents are however, generally very much willing to participate in any information campaign on environment and health issues to make the people aware of the continued hazards caused by these industries.

Environmental pollution is one of the leading causes of deaths worldwide. Cornell University scientists claimed that 40 percent of deaths worldwide were caused by water, air and soil pollution (Cornell University, 2007). World Health Organization and World Bank, (2001) claimed that over one billion people are directly affected by pollution related issues in the developing world. While the grim effect of environmental pollution may have probably sinked in the consciousness of the people in the study areas as shown by their concerns about their health, they apparently seem to be more concerned about the economic condition they might suffer if they do not have these industries in their areas. The complex task of ensuring human health while working for economic wellbeing is thus a challenge that needs to be addressed now and in the near future.

Key words: knowledge, attitude, perception, toxic and hazardous substances

ENHANCED EX-SITU BIOREMEDIATION OF SOIL CONTAMINATED WITH PETROLEUM HYDROCARBONS

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Abstract

The degradation of oil in clay soils polluted with petroleum hydrocarbons was investigated. Preliminary biodegradability tests were conducted on three soil samples (D1, D6, SR) through the addition of 2.5% soybean sludge and biostimulating agents. Biodegradation test through stimulated nitrification was done by slurry and dry soil method. Four types of nitrifying bacterial consortium (ABIL, NEC, Rizzo, Hands) were used as inocula in the slurry tests. In the dry method, the test was carried out using 10% nitrifying inoculum and a formulated supplement composed of N-P-K. The biodegradation of total petroleum hydrocarbon (TPH) was measured gravimetrically and by gas chromatography.

Preliminary tests on D1 soil showed that 2.5% soybean sludge and 2.5 g $(NH_4)_2SO_4$/L slurry exhibited the highest TPH removal of 70% within 7 days, followed by Nutriflok (62%) and by induced sporulation (44%). The enhanced degradation can be due to the biostimulating effect of the supplements and the emulsifying effect of the soybean sludge resulting to increased oil bioavailability. In the slurry system, 25% NEC exhibited a significant TPH degradation of 71%, 66% and 67% for soils D1, D6 and SR, respectively within 14 days. In the dry method, SR soil had a significant TPH decrease of about 76% while D6 had 39% within one month. The efficiency of biodegradation was found to be highly related to bioavailability and composition of TPH and the soil physical properties. Biodegradation through stimulated nitrification in soils can potentially be used as a strategy for ex-situ cleanup of clay soils contaminated with petroleum hydrocarbons. The slurry system can be a valuable approach but the dry soil remediation technique can be a cost-effective alternative for large scale remediation operations.

Keywords: bioremediation, total petroleum hydrocarbon, biostimulation, bioavailability, nitrification

EFFECT OF VARIOUS LEVELS OF DIFFERENT ORGANIC FERTILIZERS ON THE GROWTH AND SURVIVAL OF LUBEG [*SYZYGIUM LINEATUM* (ROXB.) MERR. & PERRY].

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Abstract

The study sought to determine the effect of varying levels of different organic fertilizers on the growth and survival of Lubeg seedlings. Specifically, the study aimed to find out if there are significant differences in the growth of Lubeg seedlings in terms of survival, height increment, root collar diameter, root length, root-shoot ratio, leaf area, ovendry root biomass, ovendry shoot biomass and ovendry total biomass. A 4 x 4 factorial experiment was laid out in a Completely Randomized Design (CRD). The result of the study revealed that the organic fertilizers at various levels had no significant effect on the survival of

the Lubeg seedlings. The different organic fertilizers had significantly influenced the height increment, root collar diameter increment, ovendry shoot biomass and ovendry total biomass of the seedlings. Lubeg seedlings applied with Biosynergy at 30 g had highest height increment, root collar diameter, leaf area, ovendry shoot biomass and ovendry total biomass over Sagana 100 and Providence Organic Fertilizer. Likewise, inferior growth was observed for those seedlings applied with Mykovam. The amount of organic fertilizers used, which is 30 g, significantly affected Lubeg seedlings height increment, root collar diameter increment, ovendry shoot biomass and ovendry total biomass. The application of 30 g Biosynergy is hereby recommended to produce good quality seedlings of Lubeg.

Keywords: lubeg, organic fertilizers, ovendry, biosynergy

EPISTEMIC DEMANDS OF HARNESSING THE EMERGENCE OF SCIENCE AND TECHNOLOGY

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Abstract

Many humans are aware of the ongoing environmental problems and the emergence of human science and technology, yet only few are rightly informed about their implications to the existence and sustainability of human life. These well-informed few are predominantly practitioners of their own field of specialization, such as the natural or applied scientists and their adherents. But it is argued in this presentation that the vast majority of the human population is not as well-informed as the scientists or as environmnetalists, in spite of the emergence of science and technology. Hence, together with this emergence, there is a need to enhance the right human epistemic mechanism that should generate the true information, so that the vast majority of humans will be enabled to prevent further environmental destructions and responsibly act on impending natural disasters.

Keywords: epistemic, emergence, science and technology, sustainability

PHYSICOCHEMICAL AND BIOLOGICAL CHARACTERIZATIONS OF LEACHATE AND GROUNDWATER IN CEBU CITY SANITARY LANDFILL, CENTRAL PHILIPPINES

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Abstract

This study assessed the status of Cebu City Sanitary Landfill and its adjacent groundwater resources based on the selected physicochemical parameters: temperature, pH, electrical conductivity (EC), total dissolved solids (TDS), total suspended solids (TSS), total solids (TS), dissolved oxygen (DO), biological oxygen demand (BOD), chemical oxygen demand (COD), and selected metals (mercury (Hg), lead (Pb), chromium (Cr), cadmium (Cd), and copper (Cu)). The total and fecal coliform bacteria were also determined. Sampling was carried from April to May, 2010 with 45 days interval. Three leachate samples and two groundwater samples at 10 m and 100 m at proximate distance from the landfill were analyzed respectively. Results showed that coliform count were substantially high in both sampling periods exceeding the national standards for drinking water. Distinctively, average concentrations of Cd (sampling 1:0.0078 ppm; and sampling 2:0.0128 ppm), and Pb (sampling 1:0.2317 ppm; and sampling 2:0.4391 ppm) in one of the leachate samples were significantly high. Percolation to groundwater may not directly suggest total metal deposition, however, groundwater samples apparently failed to meet the minimum standards for Pb on the second sampling (0.0521 ppm and 0.0282 ppm) where the recorded precipitation was lower characterized by El Ñino. Likewise, the mean BOD and COD values failed to meet the national standards except for groundwater samples. Relative to this, significant levels of TDS exceeded the national standards correlated with the determined average conductance value. Other parameters are within the tolerable values. Quantification of groundwater contamination brought by landfill's leachate is diverse, originating from anthropogenic and natural ecosystem cycles. Hence, further study considering seasonal variation is in progress.

Keywords: leachate, groundwater, sanitary landfill

ABUNDANCE AND SPECIES DIVERSITY OF MACROBENTHIC FLORA AND FAUNA IN THE INTERTIDAL AREAS OF BAYABAS,CAGAYAN DE ORO CITY, POBLACION,OPOL AND TUBAJON, MISAMIS ORIENTAL

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Abstract

This study was sought to determine the abundance and species diversity of macrobenthic flora and fauna species in the intertidal areas of Bayabas, Cagayan de Oro City, Poblacion Opol, and Tubajon Laguindingan, Misamis Oriental. A study traces the effects of human activities on the marine intertidal area. Against this background it assesses the current state of the marine environment and looks at the problems ahead. The objectives of this research were to determine the different types of macrobenthic flora and fauna in the intertidal areas of Bayabas, Cagayan de Oro City, Poblacion, Opol, and Tubajon, Laguindingan, Misamis Oriental, the diversity indices of macrobenthic fauna of the three stations, and the significant differences between the diversity indices of the three stations. A descriptive-comparative research was used in the collection of data. The data of the study was collected through transect-quadrat sampling and informal interview from the coastal residents and gleaners. Station 1 was situated in Zone 3, Barangay Bayabas, Cagayan de Oro City and Barangay Poblacion, Opol and Tubajon, Laguindingan, Misamis Oriental were stations 2 and 3, respectively.

A total of nineteen (19) macrobenthic flora and fauna species were found in the three established sampling stations. Of the total 19 species, nine (9) species were found in Station 1 (Bayabas), 14 species in Station 2 (Opol) and 17 species in Station 3 (Tubajon). Based on the results of this study, the following conclusions were made. There is significant difference between the sampling sites of Bayabas, Cagayan de Oro City and Poblacion Opol, Misamis Oriental in terms of macrobenthic fauna species. Poblacion Opol, Misamis Oriental (Station 2) attained the highest diversity index during the second sampling period. But in the five sampling periods, Tubajon, Laguindingan (station 3) consistently got the highest score and all macrobenthic flora were present in the whole sampling period.

Keywords: Diversity, intertidal macrobenthic, transect-quadrat

FLORISTIC COMPOSITION, DIVERSITY AND HEALTH CONDITION OF TREES IN PUBLIC GREEN SPACES IN MAJOR URBAN CITIES IN WESTERN VISAYAS, PHILIPPINES

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Abstract

The study was conducted in six public green spaces of Bacolod City and Iloilo City from March to December 2009. It aimed to determine the floristic composition, diversity and health condition of trees in public green spaces in major urban cities in Western Visayas, Philippines.

Eucalyptus camaldulensis was the most common tree species in Bacolod City while *Swietenia macrophylla* was prevalent in Iloilo City. Of the 1,892 woody species in Bacolod City, there were 52 species, in which 37.25% were exotic, 45 genera, and 26 families. In Iloilo City, there were 563 woody species, comprising 34 species, in which 70.59% were exotic, 33 genera, and 21 families of trees. Simpson Diversity index was high in the green spaces of Iloilo City and moderately high in Bacolod City. Species eucalyptus, genus *Eucalyptus* and family Myrtaceae in Bacolod City, and *S. macrophylla*, *Acacia auriculiformis* and *Terminalia catappa*, genus *Swietenia* and family Meliaceae exceeds threshold level of diversity for urban trees. Species importance value based on dbh and crown diameter shows that *E. camaldulensis* was the most important species in green spaces of Bacolod City. On the other hand, *S. macrophylla* was the most important species in green spaces of Iloilo City based on dbh and crown diameter. Leaf spot and anthracnose were the most common leaf diseases, while canker and stem rot were common stem diseases. Embedded nails and GI wires were the most common causes of injury of the trees. Overall Tree Condition Rating showed that majority of trees in Pana-ad Park and Stadium and Plaza Libertad belonged to Cass I, Bacolod City Plaza and Jaro Plaza belonged to Class II, Capitol Park and Lagoon and Lapaz Plaza belonged to Class III.

Key words: diversity, floristic composition, green space, health condition, urban forest

THE DIVERSITY OF INDIGENOUS ORCHIDS FOR CONSERVATION, REGENERATION AND RE-INTRODUCTION TO SELECTED PROTECTED NATURAL HABITATS AND COMMERCIALIZATION IN PALAWAN

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Abstract

This study was conducted primarily to collect, conserve and re-introduce indigenous orchid species of the Philippines in selected protected natural habitats and home gardens and eventually for commercial production. Specifically; the study was conducted to assemble and conserve the diversity of indigenous orchid species by collecting germplasm from collection points and home gardens; to regenerate the genotypes and produce planting materials of selected taxa of indigenous orchids using *in vitro* protocols; and to re-introduce diversity of selected taxa of indigenous orchids in selected natural habitats in Palawan and ornamental home gardens in selected localities in the Province of Palawan. Two species of orchids (*Phalaenopsis* and *Aeridis* species) were successfully propagated using in-vitro protocols at NPGRL, IPB-UPLB from the pods collected in Palawan after artificial pollination. Eight different genotypes of orchids were regenerated at the WPU orchid nursery the: (1) *Coelogyne* sp., (2) *Dendrobium anosmum*, (3) *Dendrobium sp*. (4) *Grammatophyllum scriptum,* (5) *Phalaenopsis grandiflora,*(6) *Spathoglottis plicata,* (7)*Vanda hookeriana* and (8) *Vanda lamellate*. *Calathe* sp., *Cymbibium* sp. and *Vanda sanderiana* were not able to survive in Palawan condition. Other indigenous species of orchids were photographed and collected but they were not successfully propagated and/or botanically identified. Four re-introduction sites were identified. These include: (1) Estrella Falls -Narra, Palawan; (2) El Nido Protected Area-El Nido, (3) Palawan;Wildlife and Rescue Center –Puerto Princesa City and (4) PPC Subterranean Park- Sabang Puerto Princesa City. The re-introduction was delayed due to small and few orchid plantlets available and logistical factors.

Keywords: Palawan, Indigenous Orchids, Conservation, Habitats

HYBRID SUPPLY RESPONSE AND PROJECTION OF PALAY IN THE PHILIPPINES USING LEAST SQUARES SUPPORT VECTOR MACHINE, 1994-2009

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Abstract

Supply response models have given emphasis on the responsiveness of farmers to economic and institutional factors such as input prices and government intervention programs. However, the apparent impacts of climate change in agricultural production makes the inclusion of a climatic variable more relevant. This paper aimed to improve an econometric model of the supply of palay in the Philippines using

Least Squares Support Vector Machine. It specifically aimed to (1) describe the production, area and yield of palay from 1994-2009; (2) identify factors affecting the production of palay; (3) measure the effectiveness of the hybrid supply response model; and (4) identify problems in the rice industry, especially those related to climate change, and provide policy recommendations to address these concerns.

From the period 1994-2009, quarterly data on production averaged at 3,278,690 metric tons with a growth rate of 14.97%. This increasing trend in production is attributed to the positive growth rates registered for quarterly area planted and yield of palay posted at 14.45% and 0.79%, respectively. On the average, 1,002,374 hectares per quarter were cultivated resulting to a quarterly yield of 3.26 metric tons per hectare. As revealed by the supply response model, the factors which affect the production of palay were the subsidy, El Niño, La Niña, and number of typhoon occurrences. Whereas, lagged price of rice, lagged price of corn, wage of farmers, land area, and the ratio of remaining area to be developed over total area of irrigation were not significant at 10 percent level of probability.

Using the Least Squares Support Vector Machine (LSSVM), a hybrid supply response model was estimated. Quarterly data used in the study were grouped into in sample (1994-2007) and out of sample (2008-2009). The comparison between the original and hybrid supply response model was performed with the aid of Mean Absolute Deviation (MAD), Mean Squared Error (MSE) and Hit Rate (HR). Based on the results, the latter model was found to be more effective as it yielded better results.

Keywords: Climate Change, Least Squares Vector Machine, Rice Production, Supply Response

THE HUMAN ECOLOGICAL IMPERATIVES OF COMMUNITY RESETTLEMENT AS A RESPONSE TO ENVIRONMENTAL PROBLEMS

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Abstract

Resettlement cuts across societal and temporal contexts. It is a phenomenon which obviously has spatial and bio-physical obvious components, but which also importantly involves social, economic and cultural considerations. The paper is based on the exploratory study of a resettlement community in Calauan, Laguna, Philippines. Majority of the population consist of resettled households whose transfer to the area is a consequence of two incidents pertaining to the environment. First are the resettlers who were originally informal settlers living in public places along Estero de Paco, a tributary of the Pasig River. Their resettlement was a consequence of an on-going project to clean and rehabilitate the Pasig River. The second category consist of resettlers is the one affected by severe flooding in Metro Manila brought by typhoon Ondoy (international codename: Ketsana). The study made use of a combination of rapid methods and the examination of existing data. The rapid methods include key informant interviews, ocular observations of the resettlement site and focused group discussions. Using a human ecosystems framework, a general comparison of the two categories of resettlers showed that inspite of glaring differences, both groups share the need for human ecological factors necessary to ensure the building of a sustainable

community in the resettlement site. These human ecological imperatives fall under four main classifications, namely, environmental integrity, food and nutrition security, opportunities for the development of the constituents' full human potentials, and the development of empowered organizational and institutional support systems. The paper recommends further research on human ecological imperatives for resettlement as a response to improving human-environment interaction. It also makes recommendations for resettlement management purposes.

Keywords: community resettlement, human ecological imperatives, human ecosystems

WASTE MANAGEMENT AT THE AUTOMOTIVE SHOPS IN METRO CEBU

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Abstract

The Automotive Repair Code of Practice requires management of proper disposal and containment of automotive wastes such as petroleum products; also regulated are heavy metals and wastes such as grit and sand. Automotive repair includes all collision and mechanical repair shops, boat motor repair shops, service stations, oil change, auto detailing and engine washing stations, vehicle dealerships and recycling operations. This study assessed the waste management practices of the different Automotive Service Shops in Metro Cebu, employing the descriptive method of research. Most employees of the "all-service shops" have no formal training or seminars on waste management and environmental laws, while "new car dealer shop" employees have 100 percent attendance to formal training and have available waste management facility and equipment. "Automotive service shops" employed waste management practices like collection, segregation, storage, treatment, disposal and recycling. Treatment of waste at company site was not fully implemented due to the presence of garbage collectors and waste treatment facility in the community. The production of hazardous wastes of all service shops could be attributed to its service and repair of old and used vehicles. Partial awareness of the respondents in the compliance with environmental laws was evident. In order to intensify the implementation of environmental laws, an approved waste management system must be complied with before issuance of license to operate.

Keywords: automotive waste, Metro Cebu, hazards.

POLLUTERS AND WATER QUALITY OF CEBU CITY RIVER

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Abstract

Cebu City Port waters are assessed based on microbial count to monitor its quality during rainy and sunny days, to determine the cause of water pollution. Water samples collected during rainy days had higher mean bacterial plate count compared to sunny days. Wastewater runoff, from the residential and industrial areas to the Palma river, are the main sources of domestic and industrial pollutants. One of the management options available is the rehabilitation of Palma river which is being utilized by the residents as "septic tank" of human waste and dumping area of solid and liquid wastes. This study determined the main causes of severe water pollution using the contingent valuation method (CVM) with Barangay officials and purok leaders as respondents. Waste disposal practices of the residents and industries within the runoff area are the causes of pollution which require urgent environmental concern. The major source of waste water discharges that directly drains into the river are residential, commercial, and industrial effluence. Residential polluters within below the poverty line are willing to pay PhP50.00 a month as charge per household for wastewater treatment fee based on the volume of water consumption gauged on Metropolitan Cebu Water District meter system. Policy for the tariff system shall be necessary.

Keywords. river, pollution, waste disposal practices.

MICROBIAL REDUCTION USING BAMBOO CHARCOAL AS WATER FILTER

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Abstract

The quality of Cebu Technological University (CTU) water particularly on its biological aspect needs to be reduced in order to improve its quality and maximize its usage. Crushed bamboo charcoal filter was designed to improve CTU water quality based on biological parameters particularly total bacterial count in colony forming unit per ml, and total coliform count in most probable number per hundred milliliter, and physico-chemical parameters including pH, temperature, density, alkalinity, salinity at 15°C, and calcium hardness. The water sample filtered using Crushed Bamboo Charcoal Filter had the least bacterial count in colony forming unit per milliliter sample and total coliform in most probable number per

hundred milliliter sample compared to the CTU water samples before filtering, water samples filtered using powdered bamboo charcoal and commercial filter. The electrometric method for pH and temperature tests revealed that the water filtered using crushed bamboo charcoal is within proper pH levels at ambient temperature. The alkalinity level and calcium hardness in mg/liter of filtered water increases compared to the rest of the research samples including unfiltered CTU water which contained least level using Titrimetric method and EDTA-Titrimetric method, respectively. The desalination of water was done since there was decreasing trend of salinity at 15°C level, in parts per thousand of the filtered water.

Keywords: bamboo charcoal, filtration, water treatment.

POPULATION STRUCTURE AND LENGTH-WEIGHT RELATIONSHIP OF YELLOWFIN TUNA (*Thunnus albacares*) IN WEST SULU SEA: WITH NOTES ON CONDITION FACTOR AND FISHING GROUND

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Abstract

Yellow fin tuna (*Thunnus albacares*) stock was assessed to determne the current status of its population in the West Sulu Sea. Fish landing survey was conducted at Citra-Mina Seafood Corporation in Sta.Lourdes, Puerto Princesa City, Palawan from April to September 2008. Ninety one specimens were sampled. The size ranges from 110 cm to 170 cm with modal length of 136-140 cm consisting of 20 individuals, while the least having 166-170 cm consisting of only one individual. The highest catch per unit effort (CPUE) was recorded in September (78.4 $kg.boat^{-1}.day^{-1}$) while the lowest in July (21.2 $kg.boat^{-1}.day^{-1}$). Highest catch was recorded in June (1,119 kg) and the lowest was in September (549 kg). The length-weight relationship (LWR) was $W= 0.85603L^{2.185}$ and the condition factor was 2.74. Waters surrounding the Island of Tagulinog was the most popular fishing ground. Highest catch was related to calm weather which influences more fishers to go on fishing. Calm weather also drives slow current velocity thus, increases catching efficiency.

Keywords: Yellowfin Tuna, West Sulu Sea, population structure

RICE WASTE UTILIZATION AND ITS CARBON DIOXIDE EMISSION IN SELECTED FARMS IN PANGASINAN, PHILIPPINES

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Abstract

Rice waste increases as more rice is produced to feed the burgeoning population. Rice waste refers to the different forms of waste materials generated during rice harvesting and milling, e.g. rice straw and rice hull. This study on rice waste was conducted in the Pangasinan, the Philippines' third largest rice producing province. Three agricultural systems were looked into: Organic Agriculture, Low External Input Sustainable Agriculture (LEISA), and Conventional Agriculture. Purposive sampling was done in selecting the farms, and systematic sampling in identifying the farmer respondents. Secondary data were gathered from various documents while primary data were taken with the use of questionnaire. Rice wastes generated during the first cropping season were taken from dumping and milling areas and weighed. The equivalent carbon dioxide emitted due to the burned or composted rice straw was computed using basic assumptions and formula. Soil samples were taken before planting and after the harvesting of the rice. Air-dried composite mixtures were analyzed in a laboratory to determine the pH, organic matter, N, P, and K contents. T-tests at 90 percent level, two-tailed were used in comparing differences on soil pH, OM, N, P, and K. It was found out that among the three agricultural systems, Organic Agriculture produced the highest amount of rice straw, followed by LEISA. The average range of rice waste generated per landholding was shown. Farmers practicing Organic Agriculture or LEISA fully utilized rice wastes. Organic Agriculture farmers who practiced rice straw composting significantly helped reduce carbon dioxide emission by 54 percent. The carbon dioxide emitted from rice hull conversion to carbonized rice hull was also computed. It is recommended that farmers should also be given seminar-training on various ways of utilizing rice wastes. Calculations on equivalent carbon dioxide emissions from burning of rice straw and rice hull should also be validated.

Keywords: rice waste utilization, organic agriculture, LEISA, carbon dioxide emission

EVENT ANALYSIS ON THE EFFECT OF SEVERE WEATHER CONDITIONS IN MANILA ON THE PHILIPPINES STOCK PRICE INDEX (PSEI) FROM JANUARY 1998 TO SEPTEMBER 2010

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Abstract

There are a lot of speculations that weather conditions have an impact on the stock market, especially nowadays that the climate change is evident. Thus, there is a need to have scientific evidence

whether this claim is true or not. In order to do this, an event analysis is used in this paper where the events considered are the rainy days in Metro Manila with an occurrence of a wind speed greater than or equal to 30 kilometers per hour. The corresponding stock price index in the Philippines on those days is assumed to be abnormal returns. The normal returns are forecasted by using the 20-day moving average, which is a common forecasting model for stock prices. However, using the t-test, it has been found out that at a 10% level of significance, severe weather conditions have no significant effect on the Philippine Stock Exchange Index.

Keywords: weather condition, stock prices, event studies, moving averages

VISIBILITY OF ENVIRONMENTAL FEATURES IN METRO MANILA MUSEUMS: A STUDY ON THE INTERPLAY BETWEEN HISTORY AND THE PHYSICAL SETTING

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Abstract

Museum visits have become integrated to the curriculum as valid activities meant to enhance classroom instruction in the field of history. Recently published textbooks on Philippine History have incorporated in their framework the importance of geography, geology, and the environment in the understanding of the historical process. The environmental shift in historical studies is gaining ground. This paper will highlight facets of the history-environment interplay as perceived by History 1 students of UP Los Baños in fieldtrips held during the first semester, 2009-2010. The research problem is focused on the visibility of selected features of the environment, namely: lake, mountain, river, sea, forests and plains. The museums involved in the study were the Veterans Federation of the Philippines' Museum, Library, Archives and Theatre (VFPMLAT), the Ayala Museum (AM), the Museo ng Katipunan (MK), the Manuel Quezon Memorial Shrine (MQMS), and the Bantayog ng mga Bayani/Heroes Monument (BNMB).

Majority of the participants acknowledged the efforts of the museums in providing links between history and the physical environment. Of the 265 students, 131 or 49.4% of the participants found the museums successful in showing the connection between history and the environment; 103 (38.9%) very successful; 27 (10.2%) moderately successful; and 1 (0.4%) slightly and not successful. They also evaluated the importance of the environment in shaping historical events as highly important in both Ayala Museum and Veterans Museum; important for Katipunan Museum; slightly important for Quezon Memorial Museum; and not important for the Bantayog Museum. Furthermore, the students made an assessment that the off-campus undertaking was a successful pedagogical strategy.

Keywords: museum, fieldtrip, history and environment

INFLUENCE OF ORGANIC ENZYMES ON THE QUALITY OF CEBU TECHNOLOGICAL UNIVERSITY DEEP WELL WATER

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Abstract

The quality of Cebu Technological University (CTU) water particularly on its physic-chemical and biological aspects needs to be reduced in order to improve its quality and maximize its usage. Water treatment using organic enzymes extracted from seaweeds, fruits and added with a liquid solution of activated carbon was conducted and its effects were based on physico-chemical parameters particularly total suspended solids, in mg/L and salinity in parts per thousand and biological parameters particularly *Escherichia coli* in most probable number per 100 ml. The water sample treated with organic enzymes for three days had less than 0.10 mg/liter for the supernatant while the precipitate contained 551 mg/liter for the total suspended solid, while there was a decrease of salinity level of the supernatant from 4.5 to 4.2 ppt and 10.8 parts per thousand for the precipitate. However, the *E. coli* of the treated water increased with enzyme concentration.

Keywords: organic enzyme, water treatment, desalination.

A COMPARATIVE MANAGEMENT OF TWO NATURAL LAKES: THE LAGUNA DE BAY OF THE PHILIPPINES AND THE SUN MOON LAKE OF TAIWAN

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Abstract

This paper highlights the similarities and differences of the two lakes, in terms of their respective uses, problems and prospects, best practices and certain policy implications. A simple Stakeholder's- SWOT (i.e. Strengths, Weaknesses, Opportunities and Threats) method of analysis was utilized in assessing the two lakes. The Laguna de Bay is the biggest lake in the Philippines covering an area of 95, 000 hectares with varied uses ranging from recreation to power generation. The various uses of the lake correspond with the number of stakeholders of the lake, which in some cases have conflicting interests to protect. The Sun Moon Lake of Taiwan, on the other hand, is essentially considered an eco-tourism area. It is being advertised as a "honeymooner's haven." As an eco-tourism place, it has recreation areas, hotels and other tourist attractions like temples, abode of indigenous peoples in some areas and some patches of vegetation like betel and tea plantatations, not to mention botanical gardens. Like the Laguna de Bay, it is also a source of electrical power for Taiwan similar to Laguna de Bay. The stakeholders of both lakes also, equally,

involve fishermen, business and industry, among others, operating in the area of the lake. Both have also problems of pollution and governance which they are trying to solve, in line with their respective preservation and conservation policies, programs and projects.

Keywords: management, lake, Laguna de Bay, Sun Moon Lake

IDENTIFICATION OF THE ANTIMICROBIAL COMPOUND OF THE SEA HARE *DOLABELLA AURICULARIA* EGG STRING AGAINST ENTEROBACTERIA *ESCHERICHIA COLI*

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Abstract

Antimicrobial resistance among pathogenic bacteria has been a problem. These concerns lead to continuous search and development of new drugs from various sources including marine organisms. Preliminary study showed that egg string of *Dolabella auricularia* (marine herbivore) commonly known as "lukot", showed antimicrobial activity against *E. coli*. However, there is a need to confirm such inhibitory activity and then possibly identify the compound. Hence this study is pursued to validate the antimicrobial activity of the extract from the egg string of *D. auricularia* and characterize the said compound.

Egg strings of sea hare were collected from Pujada Bay and air-dried for about 4-5 days. Dried egg strings were pulverized then weighed 200g and soaked in 275 ml of 95% ethanol for 24 hours. Extracts were then filtered and condensed by rotary evaporation and stored at 4°C for further analysis. Soft agar bioassay was employed to test the antimicrobial activity of the extract against *E. coli* using the Luria Bertani (LB) agar. Analyses and characterization of the compound were carried out by Lowry and Bradford methods for protein assay, ninhydrin test, thin layer chromatography and sodium dodecyl Polycrylamide gel electrophoresis (SDS-PAGE) using 3 different stains such as coomassie brilliant blue R250 (CBB-R250), stains all and alcian blue.

Results agree with the previous findings on the antimicrobial activity of the egg string extract against *E. coli* as indicated by the clear zone formation around the paper discs previously soaked in the sample and placed in a soft agar culture. Preliminary data also revealed that the said antimicrobial compound could be a peptide glycan of low molecular mass. However, there is still a need to purify the said compound and to conduct structural analysis before this can be further proven.

Keywords: antimicrobial activity, sea hare, enterobacteria

ASSESSMENT OF SEA HARE (*DOLABELLA AURICULARIA*) EGG STRINGS AS MARINE POLLUTION BIOMONITOR INDICATOR ON COASTAL WATERS OF REGION XI

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Abstract

The study was conducted to assess sea hare (*Dolabella auricularia*) egg strings as marine pollution biomonitor indicator on coastal waters of Region XI. Samples of sea hare egg strings, sediments and water were randomly collected from the coastal waters of Guang-guang and San Isidro as sampling sites representing Pujada Bay and Davao Gulf, respectively. Collection of samples was done from February 25-26, 2010 and March 03-04, 2010. The analyses of the samples of heavy metals were conducted at the University of Immaculate Concepcion (UIC) Chemical Laboratory in Davao City. Other environmental parameters such as water transparency and temperature were recorded simultaneously during sampling and observations on its habitat status were noted as well.

Results showed that the heavy metals paticularly Lead (Pb), Mercury (Hg) and Organo-Phosphorus (OP) were evident in sea hare egg strings, their habitat such as the sediments and water environment. Significant differences of levels of heavy metals concentrations were noted in two sampling sites at 5% and 1% critical levels through multivariate analysis of variance (MANOVA) using the Hotelling T^2. Lead (Pb) exposure on egg strings, sediments, and water has the highest results compared to Mercury and OPs. Pb exposure range from 10.47 ppm to 11.95 ppm; Hg exposure range from 8.52 ppm to 9.88 ppm; for OP ranges from <0.01 ppm to 0.01 ppm in Guang-guang, Pujada Bay and San Isidro in Davao Gulf, respectively. Degree of concentration of heavy metals and other contaminants also exceeded the critical limit of 0.05 ppm set by the European Union (EU) standard and DENR Administrative Order No. 35, Series of 1990. Other environmental factors are on their normal level of sea water standards such as temperature (^{0}C) and transparency(m). A minimal variations in Guang-guang, Pujada Bay and San Isidro in Davao Gulf was noted. Findings in this study have shown further that levels of heavy metals in San Isidro which is located within Davao Gulf had much higher values than in Guang-guang, Pujada Bay for all the heavy metals analyzed.

Keywords: Sea hare,habitat, Biomonitor, indicator, heavy metals, contamination

PROFILE OF SEATURTLE CATCH, NESTING INCIDENTS AND HATCHLING EMERGENCE SUCCESS: AN INTEGRATED STRATEGY ON SEA TURTLE CONSERVATION PROGRAM IN BARANGAY DAHICAN, MATI, DAVAO ORIENTAL

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Abstract

This report presents the initial documentation of sea turtle population nesting or visiting the area as a means of conservation strategy. An actual documentation with the local people in the coastal community of Barangay Dahican showed the presence of Olive Ridley (*Lepidochelys olivacea*), green sea (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and the leatherback (*Dermochelys coriasea*) species in the area and loggerhead (*Caretta caretta*). In March to August 2010, 12 green sea turtles, 9 hawksbills, and 7 olive ridleys have been turned over by local people from Brgy. Dahican alone as by-catch of fishery-related activities. Of these, 4 were intentionally caught while the 24 endorsed turtles were accidentally caught. Various sizes of by-catch have curved carapace width-length measurement of *C. mydas* ranged from 28-30 cm to 48-50 cm; that of *E. imbricata* ranged from 18-23 cm to 36-38 cm while *L. olivacea* ranged from 48-50 cm to 78-80 cm. In the 6 documented nesting incidents, hatchling success for *L. olivacea* range from 29.2% to 89.6% with an average of 73.6%. Hatchling success for *C. mydas* based from 1 documented nesting incident is 86.7%.

Despite the legal protection, it is ubiquitous that turtles are still slaughtered for their meat and their eggs collected for food in some part of the area. An underestimation of the rate of turtle mortality is likely as some local people do not confirm or are reluctant to divulge these practices for fear of retribution.

Keywords: sea turtle conservation; sea turtle nesting; sea turtle hatchling emergence; Mati marine resource conservation

BIRD STRUCTURE AND RICHNESS IN THE MANGROVE FORESTS OF DAVAO ORIENTAL: BASELINE DATA IN MONITORING IMPACTS OF CLIMATE CHANGE AND DEVELOPMENT ACTIVITIES

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Abstract

Bird surveys documenting bird population in mangrove forests in Davao Oriental were initiated in 2008 to serve as a baseline data to which impacts of climate change as well as development activities can be gauged in the future. This report presents the result of bird survey in two mangrove forests located in

different municipalities of the province. The Guangguang Mangrove Forest (GMF) was studied in Nov 2008 to Jan 2009 while the Lavigan Mangrove Forest (LMF) was studied in Jan to Feb 2010. Both are dominated by secondary growth of mangroves with *Sonneratia* spp. and *Rhizopora* spp. as the dominating species. Data gathering employed the point counting and ground mist netting approaches and are assisted by technical people from the Phil. Eagle Foundation (PEF).

While bird survey was conducted in GMF in the period where migrant species are expected to add to the local resident population, LMF harbors more birds and more species. Four species were observed only in GMF while 23 species were observed only in LMF. The higher bird abundance and species composition in LMF is likely the result of less disturbance and available contiguous habitats, with the area having less human settlement and margined landward by a mountainous terrain, hence underlying the importance of available and safe habitats in the biodiversity of an area. Overall, 43 species under 24 families were observed with Columbidae (doves) having high species richness (5 species) and *Nectarinia jugularis* (olive-backed sunbird) as the most abundant species. While majority are resident species about 10 species are migrant while 5 species are endemic to the Philippines. There are 13 carnivorous species, 17 insectivorous species, 5 frugivorous species, 4 grain/seed-eating species, 1 nectar-feeding species, and 1 omnivorous species. All observed species are listed by IUCN as "Least Concern". Despite this conservation both to the species as well as to the mangroves and adjacent forests is necessitated as species found nowhere else outside of the Philippines are present aside from serving as "stop-over flyways" of species from other areas of the world.

Keywords: mangrove birds, bird diversity, Davao Oriental mangrove forest, Guang-guang mangrove forest, Lavigan mangrove forest

MELLIFEROUS PLANTS IN PAGBILAO MANGROVE, QUEZON PROVINCE

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Abstract

Mangrove can refer to either the ecosystem or individual plants. Mangrove forest commonly found along sheltered coastlines in the tropics and subtropics provides important environmental and socio-economic functions. However, despite of its potential for honey production, mangrove forest are not fully utilize for this purpose. It would only be the result of incidental bee hunting in the area. Bees are well known to be of considerable benefit in the pollination of commercial crops, forest and mangroves and they also make use of its by-product resource, the nectar and pollen. The study was conducted to determine the plants visited by bees in mangrove forest based on microscopic analysis of pollen collected by the worker bees.

Result of the study revealed that *Apis cerana*, *A.mellifera* and *Trigona biroi* collected pollen were belong to different families of Palms, legumes, mangroves, and others. *Cocos nucifera* was the secondary source. Important minor sources were Nipa (*Nypa fruticans),* Buta-buta /Lipata (*Excoecaria agallocha*), Ipil-laut

(*Intsia retusa*), Bakauan/Bangkau (*Rhizophora mucronata*), Tabigi (*Xylocarpus granatum*), Nilad (*Scyphiphora hydrophyllacea*), Diliuario (*Acanthus ilicifolius*) and Busain (*Bruguiera gymnorrhiza*). Other important minor and minor sources were mangrove associates and non-mangrove plants but profusely growing within the vicinity belonging to some cultivated plants, weeds, and grasses. Pollen and nectar are the basic resource harvested by the bees which can be utilized by man as a renewable seasonal benefit through proper bee management.

Keywords: Honey bees, mangrove, plants, pollen

Enterprising with Nature
Paper Abstracts

WOMEN IN HOUSEHOLD GARMENT TRADE CENTERS IN CEBU, PHILIPPINES

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Abstract

This study aimed to determine the practices of women entrepreneurs engaged in garment business at Tabo sa Banay, Cebu City, Philippines during the Calendar Year 2008 as basis for a proposed garment training skills for women household. The study employed the descriptive survey technique of research. The survey revealed that out of the 15 women garment entrepreneurs interviewed, 40 percent held managerial positions while the rests were either holding supervisory functions (6.67%) or in the rank and file (53.33%); more than 70% were 31-60 years old; 73 percent were married; and only 33.33% had college education. More than 60% of the respondents are either member of socio-civic or professional organizations. The business profile showed that 60 percent of the respondents had their company operations for 11–20 years; they are either involved in wholesale or retail (80%), or in community, social and personal services (53.33%). Only 6.67% reported to receive a return of investment of 10,000 – 15,000 pesos. The respondents identified six (6) significant reasons for becoming an entrepreneur: livelihood, small capital investment, inherited (ukay-ukay origin), and inherited from parents, job experiences and demand of products. Among the significant indicators for success, personal qualities such as self confidence and hardwork, good customer and supplier relations, proper budgeting, and the like stood out. These findings highlight the need for a forceful support for women organizations who engage in garment business.

Keywords: women garment entrepreneurs, household garment, diversification of products

WOMEN IN SECONDHAND RETAIL TRADE: ASSESSMENT OF UKAY-UKAY IN CEBU

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Abstract

Ukay-Ukay is Visayan term for "sift through" or "dig up". This study aimed to determine the profile of women in second-hand retail trade, and analyze the Ukay-Ukay market and its structure. The study employed the descriptive survey technique using the researcher-made instrument. The survey revealed that out of 15 Ukay-Ukay entrepreneurs, 40% belonged to age 20-30, 66.6% were female and 33.3% were male, 73.3% were married, and 66.67% with 0-3 children. More than 90% revealed that patrons are plenty

during weekends giving them an earning of PhP600–PhP1, 000 per day. Though more than 70% indicated that their earning is enough for their family needs, barely 24% reported insufficient income. It is recommended that there should be skill training for women in the industry who needs additional income for their families. The local government should likewise provide sheltered areas where the Ukay-Ukay vendors can sell their products to minimize traffic, and avoid costs of rentals.

Keywords: Ukay-ukay trade, second-hand retail trade, Wagwag

WOMEN IN CELLULAR PHONE CENTERS IN MANDAUE CITY, PHILIPPINES

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Abstract

The study was conducted on fifteen cellular phone repair shop owners using the survey method. The survey revealed that 67.67% is female, 53.33% is between 16-20 years old; 66.67% has college education. As to income derived from the small-scale business per day, about 53.33% has an income of PhP1,000-5,000. Based on the findings of the study, it is recommended that more government financial assistance be given to women who are engaged in this cellular phone repair business in order to maximize their economic potentials thus empowering them and making them enjoy their gains and productivity.

Keywords: cellular phone repair shop, repair business, global economy

CHALLENGES AND PROSPECTS OF RIG DRIVERS IN DULJO, CEBU CITY

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Abstract

A tartanilla is a horse-drawn carriage. In Manila and neighboring places in Luzon, a similar vehicle is called a calesa. Passenger entry in the calesa is in front of the rig; in the tartanilla, at the back. This study aimed to determine the practices of rig drivers at Duljo, Cebu City in 2009 as basis for a proposed livelihood skills training for Rig Drivers. The study employed the descriptive survey technique of researcher-made instrument. The survey revealed that 95% of rig drivers were male while only 5% was female; 75% was married; about 35% has been in this work for 21-30 years. Rigs (tartanilla) are rented for PhP120.00/day. Rig drivers start their day by giving their horses a bath, and feeding them with fodder and rice or corn bran "kumpay and tahop" before plying them in the streets. They usually work at 4-10 a.m and 12nn-6 p.m. Income is higher during weekdays where most of their passengers are students and workers

than during weekends. Their income ranges from PhP200.00 during ordinary days to PhP500.00 during peak days. Registration of a tartanilla unit is PhP140.00 annually. They are members of Rig Drivers Association in Cebu City. Aside from their income in driving, they also earned extra money from selling horse manure, which costs around PhP70.00/sack. One major problem identified by the rig drivers is the competition between them and the trisikad drivers. The respondents indicate a willingness to undergo training for an alternative livelihood to avoid the effect of the competition.

Keywords: tartanilla, calesa, rig drivers

DEVELOPMENT OF FISHERIES IN CORDOVA, CEBU

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Abstract

This study aimed to determine the profile of the poor marginalized fisher folks of Cordova and the participation of women in fishing production in order to recommend skills training as a community outreach program of Gender and Development of Cebu Technological University. Based on the data, the following findings are noted: The status profile of the respondents revealed that out of 21 respondents, about 38% is male and 62% is female; about 90.48 % is married while 4.76% is single and widow. More than 80% of the respondents have basic education and about 4-6 household members. All respondents indicate preference to fishing than working in companies situated in Mactan Island. About 62% of the female respondents helped augment the household income by vending the "catch of the day." Thus it is hereby recommended that trainings and seminars be conducted for the wives of fisher folks in Cordova focusing on fish preservation, alternative by–products of fish and cottage industries from sea shells for income generating livelihood.

Keywords: Cordova, women in fishing production, fisher folks

TERATOGENIC EFFECT AND EMBRYO-TOXICITY OF *GANODERMA LUCIDUM* EXTRACT ON THE DEVELOPING EMBRYOS OF ZEBRA FISH (*DANIO RERIO*)

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Abstract

Despite of well known anti-cancer attributes of G. *lucidum*, this study aimed to provide initial information on the potential teratogenic and toxic properties of this mushroom on the developing embryos of Zebra

fish. Zebra fish were cultured in a glass aquarium provided with the required condition, habitat and proper diet to allow them for spawning and fertilization. On the other hand, newly dried chips of G. *lucidum* were obtained from the Center for Tropical Mushroom Research and Development for extraction of the active compounds. Embryos were subjected to toxicity and teratogenicity assay to determine the lethality rate and morphological abnormalities. The fertilized eggs collected 12 hours after fertilization characterized as segmentation phase of embryo where the head and tail region as well as the somite furrows were visible. Results confirmed that the active compounds of G. *lucidum* as anticancer also performs as teratogen and toxic metabolites for developing fish embryo. Morphological teratogenic abnormalities were significantly recorded at 5% and 10% concentrations of *Ganoderma* extract that includes growth retardation, tail malformation, limited movement, severe flexure and stunted tail. Embryos at 20% concentration only showed growth retardation as endpoint due to early arrested growth after 40 hours of treatment application. While limited movement due to flexure was observed when embryos were directly exposed at 1% concentration which noted normal during the first and second observation period. However, no morphological teratogenic abnormalities was observed at 0.05%, 0.1%, and 0.5% concentrations which significantly comparable to control. Highest percentage mortality was obtained at 20% concentration with 100% followed by 10% concentration with 57% due to relatively high concentration of extract compared to other concentrations with 0% mortality rate. Taken the data together of the present study, *Ganoderma lucidum* extract at certain concentration has a potential teratogenic attributes as it causes morphological abnormalities and affects the growth and survival of Zebra fish embryo.

Keywords: *Ganoderma lucidum*, medicinal mushroom, mushroom, teratogens

CHARACTERIZATION AND SUITABILITY EVALUATION OF MAJOR AGRICULTURAL SOILS TOWARDS RATIONAL LAND AREA ALLOCATION FOR Biofuel FeedstockS PRODUCTION IN CAGAYAN VALLEY, PHILIPPINES

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Abstract

The Biofuels Act of 2006 mandates the use of biofuel as a measure to ensure availability of alternative energy without any detriment to the natural ecosystem, biodiversity and food reserves of the country, and production shall be done within marginal areas. The study aimed to identify sites considered prime agricultural lands for food and feed production and in the process delineate marginal lands that may be allocated for biofuel feedstock growing in Cagayan Valley. It employed soil characterization and suitability assessment of agricultural soils.

With the total delineated agricultural area of 911,167 hectares, there were about 360,193 hectares considered as prime agricultural lands enough for food and feed crop production to meet the regional requirement up to the projected 40 years period. There were also about 431,044 hectares of marginal lands with high to moderate suitability to cassava, coconut, jatropha, oil palm, sweet sorghum, sugarcane, and switch grass. The productivity of these marginal areas were limited by shallow rooting depth, topography, acidity and low inherent fertility, surface run-off and drainage conditions of the soils. To enhance productivity of these areas, investment on soil management and improvement has to be done.

A second level suitability assessment showed that 84 percent of the marginal land is suitable for switch grass and 54 percent was found suited for other bio-energy crops such as cassava, coconut, jatropha, oil palm, sweet sorghum and sugarcane. Furthermore, about 16 percent were considered permanently not suitable to any of the biofuel crops and were therefore recommended for afforestation for watershed purposes. Switch grass, sugar cane, cassava and oil palm proved to be more productive in terms of biomass yield, biofuel potential, and soil suitability than jatropha, coconut and sweet sorghum.

Based from the above findings, national together with local planners may find the data generated from this study valuable and therefore be applied as decision criteria in land allocation. Foremost is to ensure food security and at the same time allow Cagayan Valley to locally produce alternative energy to conform to the national program of promoting biofuel production.

Keywords: biofuel feedstocks, biomass, geographic information system (GIS), marginal lands, suitability assessment

COST-EFFECTIVE AND SUSTAINABLE WEED MANAGEMENT PRACTICE IN NON-BEARING MANGO

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Abstract

A field trial was conducted from 2007 to 2009 in Davao Oriental State College of Science and Technology (DOSCST) farm to: a) evaluate the efficacy of different weed management practices, b) come up with a sustainable and cost-effective weed control technique in non-bearing mango trees and c) suppress growth of perennial weeds in favor of the crop. Two year-old mango trees were experimented with the different weed control measures. Treatments included covercropping with golden glory or grazing peanut (*Arachis pintoi* Krap &Greg); mulching with two layers of coconut husks; slashing around the tree within the canopy; and chemical control using paraquat and glyphosate at the rate of 90 ml per 16 L tank load. Ten trees per treatment were utilized. Field experiments were laid out using randomized complete block design (RCBD)m Mango trees were spaced ten meters apart.

The mango farm is dominated by the following perennial weeds, namely; *Lantana camara* (28.91 %), *Chromolaena odorata* (27.19 %), *Digitaria ciliaris* (10.28 %), *Heliotropium indicum* (7.31 %), *Mimosa pudica* (7.31%), *Paspalum flavidum* (7.31 %), *Cyperus rotundus* (7.11%), *Centrosema pubescens* (7.11 %), and other minor weeds such as *Ipomea triloba* and *Achyranthus aspera*. Covercropping with *A. pintoi* was found to be the most sustainable and cost- effective. The cost of establishing this groundcover was P1,000 for 100 trees . It took nine months for the said covercrop to be fully established around the trunk below the canopy of non-bearing mango trees. During this period, weeds started to grow. Treatments with coconut husks started to decompose that it required another round of mulching. Chemical control lasted for 30 to 45 days and it required an expenditure of P2,000 to P3,000 every 45 days.

Keywords : covercropping, Arachis, sustainable weed management, cost-effective

INDUCTION AND MORPHOLOGY OF DWARF KOPYOR COCONUT (*COCOS NUCIFERA* L.) EMBRYOGENIC CALLUS

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Abstract

Clonal propagation of dwarf kopyor (Makapuno) coconut by somatic embryogenesis for the first time was done through callus phase. Embryogenic calluses were induced from zygotic embryo explants in the media contained 2,4-D (2,4-dichlorophenoxyacetic acid) and picloram. Explants were cultured in the Eeuwens media consisted of 2.5 $g.L^{-1}$ activated carbon, 60 $g.L^{-1}$ sucrose, 7 $g.L^{-1}$ agar, and was added with 2,4-D or picloram. Zygotic embryo explant which cultured without 2,4-D or picloram could not form callus but grew shoot instead. Growth regulator 2,4-D could induce embryogenic callus in the ranged concentration from 5 to 15 $mg.L^{-1}$. A high concentration of 2,4-D (above 15 $mg.L^{-1}$) caused explants necrotic and led to the death of the tissue. Concentration below those range resulted in a small number of callus or no response. Picloram showed less effectiveness in producing embryogenic callus compared to 2,4-D. Morphological analyses showed that embryogenic callus has friable and nodular structure, compact, with white yellowish colour, while non-embryogenic callus has spongy structure and white colour.

Key words: auxin, callus multiplication, picloram, somatic embryo, 2,4-D.

ASSESSMENT AND VALUATION OF GREENHOUSE GASES MITIGATION OF CLIMATE-FRIENDLY FARMING PRACTICES IN LOWLAND RICE AGROECOSYSTEMS IN ISABELA

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Abstract

Greenhouse gases (GHGs) trap heat in the atmosphere that results to global warming or enhanced greenhouse effect. Major GHG emitted from rice cultivation is methane (CH4) produced by anaerobic decomposition of rice straws in flooded fields. GHG assessment based on 2006 IPCC Guidelines was conducted in 30 selected Irrigators Associations (IAs) covering 7,789.34 ha lowland irrigated rice service

area in NIA-Magat River Integrated Irrigation System (MRIIS) District 2 in CY 2008. Existing farming practices emit 5,882.93 tons yr^{-1} CH4 while shifting to mid-season drainage, rice straw aerobic composting and simultaneous drainage and composting results to 2,823.81, 3,756.44, and 4,777.16 tons yr^{-1} or 48, 64 and 81% CH4 emission reductions, respectively. Values of emission reductions using 2009 World Bank price of US$12 ton^{-1} CO2e assuming Php48 1US$$^{-1}$ are Php34.16, Php45.44, and Php57.78 million yr^{-1} for mid-season drainage, aerobic composting and simultaneous drainage and composting, respectively. Partial budget analysis indicates incremental benefit of Php138.95 million yr^{-1} if farmers shift the existing practices to climate-friendly practices. ArcGIS spatial analysis displays six IAs reduce annual CH4 emission from 248.7-366.82 to 36.76-51.15 tons yr^{-1} CH4 if they fully shift from existing practices to climate-friendly practices. STELLA simulation results indicate that: keeping on existing farming practices results to linear accumulation of 5,882.93 tons yr^{-1} CH4; annual CH4 emission stabilizes at 13,000, 10,000 and 8,000 tons within 12 years for mid-season drainage, aerobic composting and simultaneous draining and composting, respectively. This information should be shared to farmers, IAs, NIA-MRIIS and LGUs through production of IEC materials (posters, flyers, brochures) and conduct of awareness-raising seminars, fora and other policy advocacy activities.

Keywords: Assessment and valuation, Greenhouse gases mitigation, climate-friendly farming practices agroecosystems

FLORAL DIVERSITY ASSESSMENT OF MANGROVE ECOSYSTEMS IN MASINLOC, ZAMBALES

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Abstract

The study was conducted to assess the floral diversity of the remaining mangrove forests in the four coastal barangays of Masinloc, Zambales. The factors that contributed to the present state of mangrove ecosystems were likewise evaluated. Three 10 x 10 m quadrats were located in each study site. The species composition and the floral diversity of each mangrove ecosystem were analyzed and compared using the following indices: Shannon-Weiner Index of Diversity (SHDI), Shannon-Weiner Index of Evenness (SHEI) and Simpson's Index of Dominance.

Ten major mangrove species belonging to five families of Rhizophoraceae, Sonneratiacea, Avicenniaceae, Palmae and Combretaceae, four minor components and six mangrove associates were identified. *Sonneratia alba*, *Avicennia marina*, *Rhizophora apiculata* and *R. mucronata* were the species common in all sites. Among the sites studied, Brgy. Inhobol was the most diverse in terms of mangrove floral composition attaining an SHDI of 0.97. The remaining mangrove forests in Masinloc are still in healthy state but comprise mainly of young mangrove vegetations. Most species were within the diameter range of

4.1 – 20.0 cm. *S. alba* was the only species representing all diameter class attaining a diameter at breast height (dbh) of more than 40 cm. Various stakeholders valued mangroves in terms of their resource and regulatory functions. Several factors, however, threatened the condition of mangrove forests in Masinloc such as the use of *sayudsod*, crab harvesting by soil digging, water pollution, coastal development, squatting, continued fishpond development and lack of formal regulations. Brgy. Inhobol should be given utmost priority in conservation since it possessed the highest mangrove floral diversity. Other areas like San Lorenzo, Baloganon and San Salvador should likewise be protected through formal regulations and introduction of wise pattern of mangrove resource utilization.

Keywords: mangroves, floral diversity, conservation, Shannon-Weiner Index of Diversity

FAUNAL ASSESSMENT AND FLORAL DIVERSITY IN MACAHAMBUS GORGE AND CAVE, LUMBIA, CAGAYAN DE ORO CITY

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Abstract

The area of study is a frequent tourist destination in the city of Cagayan de Oro. The study was meant to assess the existing faunal and floral diversity in Macahambus gorge and cave. Specifically, it aimed to: (a) identify the indigenous floral and faunal species; (b) classify its ecological status; and (c) classify its conservation status based from International Union for Conservation of Nature (IUCN) and duly verified by the DENR PAWS personnel for the conservation status here in the Philippines. Collection of data was based from the standard data gathering procedure on the assessment of wildlife flora and fauna from the Department of Environment and Natural Resources (DENR). For faunal species, time area count, trapping and interview of residents for their own accounts of animal capture were used. Three 20x20m sampling plot were established for the three plots for the collection of floral species.

For the assessment of faunal species, the three classifications of faunal species identified in Macahambus gorge and cave Seven (7) were reptilian species, eight (8) were avian species and five (5) were mammalian species. A total of 20 faunal species, of which, two (2) species were found inside the cave, the Gekko athymus and Haplonycteris fischeri. While in Macahambus gorge, specifically in the one hundred (100) steps, the Collocalia maxima and Pteropus leucopteros were found inhabitants. The rest of the classified species were found distributed in Macahambus forest gorge. In terms of conservation status, one (1) mammalian species was near threaten, two (2) reptilian species were endangered, one (1) reptilian specie was vulnerable and rest were classified as least concerned. Floral species were grouped into five categories namely, trees, fruit trees, bamboo, herbs grasses and ferns. In terms of species richness, a total of 54 floral species were recorded from sampled plots and transect walk. Of these, 23 species were trees, 3 species were fruit trees, 3 species were bamboos, 2 species were palms, 18 species were herbs and grasses and 5 species were ferns. The gathered floral data from established plot revealed that 36 species were found in the cave

covered vegetation, 40 species in Macahambus gorge and 12 species in the 100 steps within the gorge. It was observed that reforestation of tree species Tectona philipinensis and other palm species were part of the conservation approach in the area.

Keywords: Endangered, endemic, extinct, gorge, vulnerable

THE DIVERSITY OF PALAWAN TROPICAL FRUIT SPECIES FOR WINE PRODUCTION AND OTHER BY-PRODUCTS EVALUATION

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Abstract

Palawan tropical fruit species diversity is high and is threatened by anthropogenic causes such as slash and burn farming, conversion to plantation crops like oil palm, and rubber, and mining activities among others. The best method of conservation is thru domestication and utilization. Thus, the evaluation of ten Palawan indigenous tropical fruit species was conducted to determine their potential for wine production and other by products such as jam, prunes, marmalade, and champoy among others. These include *Salacca ramosiana* (*Paratungun*, Arecaceae); *Averrhoa bilimbi* (*Kamias*-Oxalidaceae); *Tamarindus indica* (*Sampalok*-Fabaceae) ;*Antidesma bunius* (Bignay-Euphorbiaceae); Eugenia sp. (*Tambis*,-Myrtaceae). *Durio graveolens*, (Dugyan-Bombacaceae) *Willughbeia* spp. (Tabo, Palau saguit-saguit, Palau biyok, Palau seko,-Apocynaceae). Other fruits such as the *Mangifera* and *Zysygium* species were available, cultivated and abundant in the wild in Palawan. However, none of these were subjected to evaluation for research or whatever purposes. Two fruit species (*Salacca ramosiana* and *Eugenia* species.) were found to have potential for wine production and other by-product based on the preferences conducted on initial wine and by-products taste test. Both species are unique, non-seasonal that making them an advantageous characteristic for processing. It is recommended that further studies must be conducted to standardize the quality of wine and its by-products. Chemical composition of these two species must be determined to establish its nutritional composition and other components that may be present in these species.

Keywords: Diversity, Palawan, Tropical fruit, Wine

USE AND AND MANAGEMENT OF PITTOSPORUM RESINEFERUM (PETROLEUM NUT) AS SUSTAINABLE BIOFUEL

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Abstract

Petroleum nut (*Pittosporum resineferum*) was earlier identified in 1980 as a possible source of fuel for the Philippines. However, the former Forest research Institute (now ERDS-DENR) was never successful in rearing seedlings from the seeds thus no plantation was ever started. PINE TREE under Dr. Bengwayan and with a grant from Toyota Foundation was able to produce thousands of seedlings from the tree and have these planted in several parts of the region. A project research conducted proved that cold stratification allowed 98 percent of seeds to germinate. The difficult process of removing the gummy substance from the seeds was done through ash treatment. To ensure the seeds for higher germination, hot plate sterilization was employed. Pests and diseases were also identified. The tree fruits in five years and PINE TREE was successful in extracting the oil and processing it from impurities. It has an octane rating of 54, much higher than jatropha curcas. Used on improvised gravity stove, the oil can replace kerosene for cooking, heating, lighting and drying. When planted and oil extracted are used especially by the rural population, it will stop families from cutting trees for fuel wood. It will also help reduce global warming by increasing forest cover.

Keywords: sustainable, biofuel, petroleum nut, carbon sink

CHIPPED ALDER AS SUBSTRATE FOR SHIITAKE IN GROWING BAGS

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Abstract

Substrate mixture having the greatest amount (63%) of chipped Alder (*Alnus japonica*) with sieve mesh size between #8 (2.38 mm) and #6 (3.33 mm) combined with small amount (21%) of commercial sawdust (having mainly sieve mesh size ≤1.41 mm), produced shiitake fruiting bags with the shortest incubation period, highest biological efficiency and highest mushroom yield. The same mixture had the highest additional benefits and return on variable cost. This trend is followed by mixing equal part of chipped alder and sawdust. Conversely, the use of commercial sawdust alone resulted in the longest incubation period as well as lowest biological efficiency and yield of shiitake; consequently having the lowest additional benefits and return on variable cost. Besides substrate particle size as greater than 1.41 mm, which favors gas exchange from within the substrates, nitrogen as greater in alder than in commercial sawdust would have attributed greater yield. The technology of utilizing chipped pruned twigs of alder as substrate for producing shiitake as a high valued crop would add to promoting alder as a well-adopted multi-purpose tree species in the highlands to address climate change and promote resource-based mushroom industry.

Key words: Alnus, shiitake, wood particle size, substrate

ACCEPTABILITY OF TRANSPARENT SHAMPOO WITH MILK AND LEMON AS ACTIVE REAGENTS

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Abstract

This is an experimental study using the randomized complete block design using ten treatments, with ITDI's Shampoo formula as control sample (T1); Treatments 2, 3 and 4 used the Shampoo formula of ITDI with 5%, 10% and 15% lemon extracts, respectively; Treatments 5, 6 and 7, used Shampoo formula of ITDI added with combination of lemon extracts and milk at 5%, 10% and 15%, respectively; and Treatments 8, 9 and 10 used Shampoo formula of ITDI with 5%, 10% and 15% milk concentrations, respectively. Effects of the varying concentration of lemon extracts and milk as active reagents into the transparent shampoo were determined based on the descriptive and acceptability sensory results before and during application. Out of the ten (10) varying concentrations of transparent shampoo, treatment with "5% lemon" obtained the highest sensory rating scores based on its weighted mean in overall mean acceptability, with significant results in appearance and scent before application and smoothness and softness during application. Before application, the product had the following properties of very light yellow color, slightly pleasant scent and slightly thick in viscosity, when evaluated during application, the shampoo was very foamy, moderately smooth, resulting to very soft hair. Only "5% lemon extract" concentration is appropriate to be added to ITDI's formula as active reagent.

Keywords: shampoo, lemon, milk, transparent.

INFLUENCE OF CALAMANSI AND VIRGIN COCONUT OIL AS ACTIVE REAGENTS ON THE ACCEPTABILITY OF LIQUID HAND WASH

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Abstract

The newly formulated liquid handwash with calamansi extract and 5 grams virgin coconut oil is light yellow in color, moderately pleasant odor, slightly thick in viscosity and very foamy based on the sensory evaluation using descriptive testing as evaluated by twenty trained panelists. The general acceptability rating of the most preferred liquid handwash with calamansi extract was "Like Moderately", while "Like Slightly", for liquid handwash with virgin coconut oil as active reagents, based on the 9-point hedonic scale as perceived by 50 consumer panelists. The most preferred sample significantly differs as to

its odor and foam-forming ability using Analysis of Variance and Duncan Multiple Range Test at 5% level of significance. Its quality is comparable with the liquid hand wash of the DOST-ITDI. The product had a pH value of 6.50 and a bacterial count of 2.00 x 10^3 cfu/g sample, per laboratory analysis. The preparation of liquid handwash with calamansi extract and virgin coconut oil lowers the cost of hand washing activities of schools, colleges and universities to prevent the influenza A(H1N1), responding to the Department of Education's call for all schools to motivate students to observe hand washing before and after eating and using the comfort rooms.

Keywords: liquid hand wash, calamansi, virgin coconut oil.

GROWTH AND DEVELOPMENT OF PRIMARY ORGANS OF OIL PALM SEEDLING UNDER SALINITY STRESS

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Abstract

Salinity through iso-osmotic stress and ion toxicity causes deterrent effects on the growth and development of primary organs in most plants. Growth and development of root and shoot of Oil Palm seedlings were assessed to determine its response to varying salinity levels (0, 85.5, 171.11, 342.21 and 684.43 mM NaCl). Shoot height (cm), percentage opened leaf, leaf area (mm^2) and shoot fresh weight (mg/plant) were significantly reduced by 2, 2.5, 3.36, 1.66 times, respectively, when Oil Palms were exposed to 342.21 mM NaCl. The number of opened leaves and shoot dry weight (mg/plant), on the other hand, were significantly reduced by 3 and 2.09 times, respectively, when Oil Palms were exposed to higher salinity level (684.43 mM NaCl). In terms of root growth and development, the number of secondary roots in Oil Palm was significantly reduced by 9.13 times at 342.21 mM, while root fresh weight was significantly reduced by 2.63 times when exposed to higher salinity level (684.43 mM NaCl). It is interesting to note that at lower salinity levels (85.5 and 171.11) Oil Palm seedlings were able to perform better compared to those without NaCl treated on the medium, though no significant difference were observed. These findings are essential as it gives important informations related to the establishment of Oil Palm seedlings in saline affected areas. Moreover these findings may be further applied as criteria for salinity tolerance screening in oil palm breeding programs.

Keywords: Primary organs; Root and shoot; Oil palm seedlings: Growth and development; Salinity level

SOCIO-ECONOMICS OF THE TILAPIA INDUSTRY IN PANGASINAN

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Abstract

The tilapias are now considered as the fish for the masses for this fish has become a part of the dish in every family. In this study, 318 tilapia growers from the 45 municipalities and two cities in the province of Pangasinan were surveyed to assess the tilapia grow-out industry of the province. Specifically, it aimed to (1) describe the personal and aquaculture profile of tilapia growers, (2) describe their best management practices, and (3) to determine the socio-economic impact of tilapia farming, and (4) identify problems they encountered and their suggested solutions to solve their problems. Results showed that, Tilapia growers in the province of Pangasinan belonged to the middle-aged group with an average age of 54 years, having a small-size family group with 4 average number of children and 5 average number of household members and are mostly composed of non-professionals and professionals with one year to fifty years of experience in tilapia farming or an average of 9.3 years in the tilapia farming industry. The tilapia farming industry in Pangasinan is a small-scale industry in terms of the size of fishponds utilized for grow-out culture where about 85% of them have less than 500 m^2 to 1 hectare or an average fishpond area of 3,450 m^2 and about 25% have more than 1 ha to 94 ha or an average fishpond area of 6.55 hectares. The tilapia grow-out culture systems in Pangasinan are either extensive method, or semi-intensive method and intensive method. More than three-fourths of tilapia growers (88.68%) in Pangasinan do not use pesticides or any chemicals to eradicate unwanted species, pests and predators. In terms of feeding, rice bran, wheat bran, bread, fresh "kangkong" (water spinach) leaves, ***Hydrilla*** are the different kinds of feedstuff used. During harvest, partial harvesting by the use of different available fishing gears such as seine net, hook and line, gill net and cast net is employed. Tilapia growers considered the tilapia farming industry in the province of Pangasinan as a profitable industry. It is recommended that the local government in each municipality should allocate funds for the conduct of extension services, and provide technical and financial assistance to the farmers/tilapia growers to assist them with their problems.

Keywords: Tilapia aquaculture, grow-out culture, socio-economics

STATUS OF TILAPIA HATCHERY IN PANGASINAN

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Abstract

The introduction of Nile tilapia (***Oreochromis niloticus***) in the Philippines in 1972 from Israel has intensified the culture of tilapia in the province of Pangasinan. To have a continuous supply of tilapia fingerlings for grow-out culture, private and government tilapia hatcheries were established to cater the supply needs of tilapia growers. Thus, this study was then conducted to determine the status of tilapia seed

production in the province of Pangasinan. Specifically, the study aimed to; (1) describe the socio-demographic and socio-economic profile of tilapia hatchery owners/managers in the province of Pangasinan; (2) describe the best management practices employed by the tilapia seed producers, and (3) the volume of tilapia seed production. The 15 existing tilapia hatcheries in the province of Pangasinan were surveyed using a survey questionnaire coupled with a personal interview by the research enumerator to the owners/managers to gather information and data on their socio-demographic and socio-economic profile, their best management practices employed, their total volume of tilapia seed production and economics of seed production.

Result of the study showed that the tilapia hatcheries in Pangasinan are managed by professionals who are graduates of baccalaureate degrees in Fisheries, Fisheries Education, Secondary Education, Agri-business and Nursing with average age of 49.5 years and with 1 year to 15 years of experience in tilapia fingerling production. The earthen pond tilapia hatcheries have a total area of 61,900 m^2 (6.19 ha) while the concrete tank tilapia hatcheries have a total area of 2,260 m^2 (0.226 ha). The most preferred stocking rate of breeders is 5-6 breeders/m^2 at 1:3 male to female sex ratio and fingerlings were collected is by the use of scoop net for small ponds and by seining by the use of seine net for large pond. The monthly total volume of tilapia fingerling production of all tilapia hatcheries in Pangasinan is recorded at 180,000 fingerlings or an average of 12,000 fingerlings sold to market outlets. Common problems for tilapia producers in Pangasinan include inadequate facilities and high cost of fertilizers and commercial feeds. It is therefore recommended that the local government should provide financial and technical assistance to fisherfolks who would like to venture on tilapia fingerlings; subsidy to lower cost of inputs; training to private hatchery owners; and control of prices of tilapia fingerlings.

Keywords: Tilapia Aquaculture, Tilapia Hatchery, Tilapia Fry and Fingerlings

FRUIT EVALUATION OF SIX PROMISING 'CARABAO' MANGO STRAINS FROM ZAMBALES, PHILIPPINES

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Abstract

The 'Carabao' mango of the Philippines ranks second among the country's export fruit crops. To develop improved strains of 'Carabao' mango with better fruit quality and contribute to the country's mango industry, a selection process was undertaken in Zambales which is one of the major mango-producing areas of the country. The 'Carabao' mango being polyembryonic, is highly variable when grown from seeds. This genetic variability provides a good opportunity for selecting superior strains from the existing seedling trees. Among the trees in Zambales, six 'Carabao' mango strains were selected based on the varietal selection standards established by the Fruit Crops Technical Working Group (FCTWG) of the National Seed Industry Council (NSIC). These promising strains were products of fruit evaluation for two to three fruiting seasons. Fruits were periodically monitored for qualitative characters such as flesh flavor, fiber, texture and aroma, and quantitative characters such as fruit weight, skin thickness, seed weight and percent edible portion. The evaluation of these six promising strains will be submitted to the NSIC-

FCTWG for registration. Once approved, it is hoped that these promising strains will be recommended to farmers and fruit growers for commercial planting nationwide.

Keywords: fruit evaluation, 'Carabao' mango

Upland Nature Studies Paper Abstracts

COMMUNITY FORESTRY FOR LEGACY: THE LICARA'S STRATEGY IN CLIMATE CHANGE MITIGATION IN KALINGA PROVINCE

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Abstract

The Liwan Calaocan Reforestation Association (LICARA) is a non-stock and non-government organization operated by 49 dedicated and environment conscious ethnic farmer members with farms covering 75 hectares land area that used to be denuded, marginal and idle grassland in Rizal, Kalinga, Philippines. After 5-years of operation, the area showed a gigantic development of the Community-Based Forest Management (CBFM) project. The soils becomes fertile, the biodiversity of soil flora and fauna increases and socio-economic condition of the farmers increases too as the project contributed in global sequestration of carbon emissions. Various forest tree species like *Gmelina arborea, Switenia macrophylla, Gliricidia sepium, Pterocarpus indicus, Leucaena leucocephala,* and other species are planted along the periphery of the farmers' farms that served as live fence and boundary plants while fruit trees *Mangifera indica, Carica papaya, Musa sapientum*, and other fruit species and agronomic crops like *Phaseolus lunatus*, *Vigna unguiculata*, *Phaseolus vulgaris* and others are planted in each farm. The low lying areas in the farm are cultivated with rice (*Orayza sativa*) where water is being supplied from the communal small water impounding project (SWIP) in the area. The SWIP is also maintained as fish pond, swimming pool for the duckery and cattle. The products in the farm are all organically produced. Compatible agronomic crops with the higher story plants are also raised underground and served as other source of income and the daily source of vitamins and minerals of the farmers. Cattle and small ruminants are also raised by the farmers in semi-confinement and cut-and-carry methods of feeding as another source of income and the protein source of the farmers' family. To date, the farmers from the nearby communities are duplicating the LICARA's experience.

Keywords: Community-Based Forest Management, agroforestry system, carbon sequestration.

ABOVE-GROUND CARBON STOCK ASSESSMENT OF TREE STANDS AT THE KALINGA-APAYAO STATE COLLEGE BULANAO, TABUK, KALINGA

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Abstract

The study was conducted to assess the amount of carbon stored in selected tree stands at KASC. It aimed to quantify the above-ground biomass production and carbon density stored based on tree classification sizes such as sapling, pole, and timber. The Narra, Yemane and Benguet pine stands were identified as the study area. Simple random sampling per stand was done for the dbh and total height measurements. The study areas were characterized based on their biophysical characteristics such as forest

floor, soil characteristics and general topography/terrain. The results of the investigation revealed that the narra stand produced the greatest volume of above-ground biomass of 619.55kg/ha/yr and carbon density of 278.8kg/ha per year. The yemane stand produced an above-ground biomass of 601.61kg/ha/yr and 270.72kg/ha per year of carbon sequestered. The Benguet Pine stand revealed the least volume of above-ground biomass production of 214.94 kg/ha/yr and a total of 96.72kg/ha per year of carbon density. This situation was attributed to the slow growth rate of the plants due to hot condition of the environment in the area. On the other hand, the pole size tree classification generally registered the largest volume of above-ground biomass and carbon density. The results also revealed that tree stands with large volume of canopy sequester greater amount of carbon. It is also concluded that plant species planted in the most suitable ecological habitat can sequester more volume of carbon emissions.

Keywords: sapling, pole, timber, above-ground carbon stock, carbon sink, carbon density

THE PHYSICO-CHEMICAL CHARACTERISTICS OF THE CORDILLERA MOSSY FOREST AS A DISTINCT ECOSYSTEM

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Abstract

This study was conducted to establish the physical and chemical characteristics and their variations according to elevation, aspects, and topography of the remaining patches of mossy forest located at the tri-boundaries of Benguet, Ifugao and Mountain Province of the Central Cordillera. The physical characteristics considered are the following: altitude, aerial temperature, atmospheric pressure and relative humidity while the chemical/soil characteristics are moisture content (MC), nitrogen (N), phosphorus (P) and potassium (K) content. This study made use of the randomized complete block design and the fixed radius plot sampling technique.

Results of this study showed that the mossy forest, which occurred at elevations 1909-2,673 meters above sea level, has a distinct physical and soil characteristics. Soil analysis revealed that the forest soil has a mean pH 4.1594, mean soil moisture content of 39.65 percent, nitrogen content mean of 4.4688 percent, mean phosphorus content of 18.812 parts per million and mean potassium content of 84.2188 parts per million. The acidic pH and potassium content of the mossy forest were found to differ in aspects while the relatively high moisture and phosphorous contents vary in terms of elevation. Generally nitrogen and organic matter contents were found out to be homogenous regardless of elevation, aspects and topography.

Keywords: Moss forest ecosystem, physical and chemical characteristics

STATUS OF ENHANCEMENT OF COMMUNITY BASED FOREST MANAGEMENT PROGRAM AND BARANGAY BANGKAL UPLAND FARMERS ASSOCIATION INCORPORATED ON AGROFORESTRY AND LIVELIHOOD PROJECTS

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Abstract

Bangkal Bataan Upland Farmers Association Inc. (BBUFAI) was the last one selected and launched (i.e. in July 2007) by the Department of Environment and Natural Resources (DENR) and the Japan International Cooperating Agency (JICA) as a pilot site of the Enhancement of Community Based Forest Management Program (ECBFMP). It is a people's organization (PO) with a highly heterogeneous membership (e.g. members are blue collar workers, peasants, and indigenous people, faculty members, and employees of the nearby Bataan Peninsula State University, BPSU). Having started small, BBUFAI has evolved into a strong organization and has managed numerous projects. It has entered a Community-Based Management Agreement (CBFMA) with the DENR prior to the commencement of the ECBFMP. The 453 ha CBFM area serves as buffer zone of the Bataan Natural Park.

ECBFMP used complementary interventions in the Showcase Site which advanced BBUFAI'A livelihood efforts in developing individual farms. The agro-forestry farms complemented the mushroom project by providing raw materials needed in mushroom culture. Unfortunately, the mushroom project did not meet the expectations and has now been shelved. The absence of Technical Working Group (TWG) in ECFMP-Bangkal did not affect, however, the effective and efficient delivery of services and accomplishment of targets. BBUFAI also initiated the development of a simple PO-level monitoring scheme. But assistance should be considered to enhance PO capabilities in the area.

Keywords: community-based forest management, Bataan Natural Park, Enhanced Community-Based Forest Management

FROM THE FOREST TO THE CITY: PERCEPTIONS OF ECOSYSTEM SERVICES AND INTRINSIC VALUES OF NATURE IN NORTHEAST LUZON, PHILIPPINES

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Abstract

Understanding local people's perceptions of nature can guide landscape and nature managers on how to respond to the visions and needs of local communities. This study examines perceptions of nature by the local people living in Cagayan province, northeast Luzon, Philippines. Using a combination of

qualitative and quantitative methodologies, the research focused on study sites along a gradient that ran from newly established hamlets in the forest, via lowland farmers and urban farmers to inhabitants of Tuguegarao city. Conceptually, the research started out from a so-called 'Visions of Nature' framework, made operational through semi-structured interviews and photo-ranking approaches involving 120 respondents, classified by site, wealth level and occupation (farmer and non-farmer). A classification of perceptions was developed based on functional (ecosystem services) and non-functional (intrinsic) values of nature. Distributional scores were obtained and compared using a combination of independent and dependent variables. The results showed significant differences between the perceptions of the occupational groups and that the perceptions of nature by the urban dwellers were congruent with those in the Western world. Contradicting the idea that nature-friendliness is a largely urban phenomenon however, the visions of the farmers near the forest had much in common with those of the respondents far away in the city.

Keywords: Local perceptions; Visions of nature; Urban dwellers; Urban farmers; Rural farmers; Nature-friendliness

FACTORS AFFECTING FARMERS' PREFERENCES ON PROPAGATION AND DIVERSITY OF NATIVE RICE IN MOUNTAIN PROVINCE

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Abstract

There were identified fifty seven (57) rice varieties being propagated in Mountain Province in the latest years. These were characterized according to cultivars group, origin, and observed sub-climatic type of the location where rice varieties were identified. Factors affecting farmers' preferences on propagation of rice were grouped according to biophysical and socio-economic factors. The identified physical factors which are resistant to drought and resistant to unusual variations of wet and dry period and also the identified socio-economic factors which are food sufficiency and greater harvests are highly significant affecting farmers' preferences of propagating rice. Farmers' high level of awareness on the effects of the identified biophysical and socio-economic factors as threat to native rice species diversity loss was determined. The identified factors affecting farmers' preferences of propagating rice which are: resistant to drought; resistant to unusual variations of wet and dry period; food sufficiency; and greater harvests are highly significant threats to native rice species loss.

Keywords: Propagation, Diversity, Native Rice

ORGANIC FERTILIZER MANAGEMENT OF NATIVE RICE ("BINGGAWAN" VAR.) IN KAPANGAN, BENGUET

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Abstract

Rapid soil fertility deterioration resulted to low production of native rice ("Binggawan" var.) was observed in Kapanagn, Benguet. This observation gave impetus to the conduct of on-farm trial in the selected native rice producing area of Kapangan using organic fertilizer formulated like the vermicompost from different substrates and liquid fertilizer extract and their combination. Specifically, the trials were conducted to determine the influence of vermicompost, liquid organic extract and their combination on the performance of native rice ("Binggawan" var.) and on soil quality. Application of vermicompost combined with liquid organic extract influenced the number of tillers, productive tillers, plant height at maturity, length of panicle, total plant weight, number of filled grain and total grain yield. Number of unproductive and unfilled grain per panicle were observed from this treatment. Application of organic fertilizer did not influence abrupt change on the final pH, OM, nitrogen, potassium, and calcium. However, the final magnesium content of the soil increased slightly by the application of organic fertilizer including the untreated plots. The copper and zinc contents were slightly increased except in plots applied with vermicompost plus liquid organic fertilizers. Increased in the Mn and decreased of Fe were observed when organic fertilizers were applied even in the control plots compared to the initial values.

Keywords: soil fertility, native rice, vermicompost

LEARNING IN THE MIDST OF CRISIS: OPPORTUNITIES FOR SUSTAINABLE LAND USE IN THE UPLANDS

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Abstract

Fuel and fertilizer price shock in 2008, followed by hydroclimatic extremes (2009 typhoons and 2010 El Niño) have brought economic constraints to monoculture farming system and drives farmers to explore other options that are economically viable. Field research has shown that farmers are willing to learn more of cost-effective technologies or revisit other options they learned from conservation NGOs including organic farming and agroforestry. Under this backdrop, a social learning package is proposed to harness their willingness. Joint Analysis and DEsign (JADE) is joint analysis and options exploration, joint

design of farmers and researchers in a social learning environment. This learning framework will make explicit water and nutrients – limiting factors of productivity – as entry point to improve farmers' understanding of their social and biophysical environment. In this way, farmers' knowledge derived from experience and institutions can be blend in with researchers' knowledge in a two-way learning process. Efforts to infuse conservation on fragile lands have been mired with promise of high income from monoculture, fuel-dependent agriculture. But with the cost of fuel and fertilizer being unstable and frequent destructive typhoons and drought occurring, an opportunity to repackage technologies in a joint learning platform can be done to show farmers the path to an efficient, equitable, sustainable upland agriculture.

Keywords: Land use; hydroclimatic uncertainties; interactive analysis; upland agriculture; Northern Sierra Madre

DIVERSITY OF FRUIT AND TIMBER TREES IN FARMER'S FARM AND RESIDENTIAL LOTS IN SELECTED BARANGAYS IN SOUTHERN LEYTE, PHILIPPINES

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Abstract

This study was conducted in six selected barangays in the province of Southern Leyte from March to April 2009 to document and revalidate tree species diversity in farmers' farm and residential lots. Specifically, it aimed to: 1) determine the tree species composition in farmers' farm and residential lots; 2) determine the most abundant fruit and timber trees; and 3) identify some reasons that motivate and hinder farmers to engage in planting trees. Data were collected through an actual interview of selected farmer respondents. The abundance of trees was determined by actual counting both in the farmers' farm and residential lots. Data were tabulated and analyzed using the descriptive statistical tools. Diversity of fruits and timber species were determined using the Shannon Diversity Index.

A total of 51 fruit and timber species in 42 genera and 28 families were recorded and encountered at farmers' farm in the different barangays. The most represented fruit trees are *Durio zibethinus, Nephelium lappaceum, Mangifera indica, Artocarpus heterophyllus, Annona muricata* and *Triphasia trifolia.* For timber trees, the family of Dipterocarpaceae got the highest number of species mostly composed of the genus *Shorea and* was followed by the species of *Paraserianthes falcataria, Eucalyptus deglupta, Shorea negrosensis, Gmelina arborea* and *Acacia mangium.* There were 35 species in 21 families and 26 genera of fruit and timber species recorded in residential lots. In fruit trees, the most common families were *Myrtaceae, Rutaceae, Annonaceae, Meliaceae, Moraceae* and *Sapotaceae.* The most abundant fruit species are *Artocarpus heterophyllus, Syzygium cumini, Psidium guajava* and *Artocarpus odoratissima*. In timber/shrub, *Fabaceae* is the most commonly encountered family in the residential lots. It is represented by the species of *Paraserianthes falcataria*, *Pterocarpus indicus*, *Swietenia macrophylla* and *Gmelina arborea*. Economics and hobby are the two main reasons that motivate upland farmers in growing fruit and timber trees. The availability of land and tenure,

availability of planting materials, DENR policy and technical information are the reasons that hinders upland farmer in tending fruit and timber trees.

Keywords: Diversity, timber and fruits.

ABUNDANCE OF TIMBER TREES IN DIFFERENT SLOPE CATEGORIES AT THE FOOTHILLS OF MOUNT PANGASUGAN, Baybay City, Leyte, Philippines

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Abstract

The study was conducted at the foothills of Mount Pangasugan, Visca, Baybay City, Leyte from April to May 2008 to describe and document the abundance of timber trees. Specifically it aimed to determine the abundance of timber trees by slope categories and canopy layers and identify factors that influence its abundance. The reference plot was preferentially selected during the reconnaissance survey. In total, twenty four sample plots which measure 20 meters X 20 meters were systematically established in three different slope categories.

A total of 4,090 stems of timber trees belonging to 35 species in 25 genera and 23 families were recorded in the study site. Upper slope and middle layer were found as the most abundant in terms of species number with 2,048 and 2,215 stems, respectively. The species of White lauan (*Shorea contorta)*, kamagong (*Diospyros philippinensis)* and Pagsahingin (*Canarium asperum)* were the most abundant tree species representing dipterocarps, premium hardwoods and non-premium trees. Results further reveal that slash and burn cultivation, collection of wildlings and illegal cutting of trees are the identified primary factors influencing the abundance of timber trees in Mount Pangasugan.

Keywords: Abundance, trees and slope categories.

COMPARATIVE DIVERSITY OF TREES AND PALMS IN THREE MOUNTAIN SITES OF MT. DIWATA RANGE, AGUSAN DEL SUR

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Abstract

The abundance and diversity of trees and palms in five sites of the lower southwestern foot mountains of Mt. Diwata Range, Agusan del Sur were determined from October 23 to November 1, 2006 and October 14-21, 2007 using quadrat and transect walk methods. In Mt. Sambilikan, Prosperidad, a total

of 85 identified tree species in were recorded along three sampling sites corresponding to three elevation gradients. *Endospermum peltatum* Merr. is most abundant, followed by *Shorea negrosensis* Foxw., based on the quadrat sampling method. Twenty six species of Arecaceae family (palm family) were recorded in Mt. Sambilikan wherein *Calamus siphonosphatus* Mart. is the most abundant. Using Shannon Diversity Index H', the tree vegetation of this site can be classified as rich, and the palms, moderately rich. However, over-all, the site can be categorized as biodiversity rich. Three species of trees are classified as critically endangered species, 4 endangered, and 11 plant species are vulnerable based on the DAO 2007-01 List of Threatened and Wildlife Species. 3 species are classified as Philippine endemic. The sampling sites of Bersheba, Bayugan City yielded 29 identified tree species. The most abundant is *Diplodiscus paniculatus* Turcz,. There are 10 species of palms with 1 species unidentified. The most abundant is *Orania palindan* (Blco.) Merr,. The diversity index for the trees is near moderately rich, while that of palms is poor. In terms of trees, there is 1 threatened, 1 endangered and 1 vulnerable species. The Ararat sampling site in Bayugan City has 26 identified tree species. The most abundant species is *Shorea almon* Foxw.. 14 palm species were recorded with *Heterospathe elata* Scheff. as the most abundant. Diversity index for trees is near moderately rich, while that of palms is poor. There are 2 endangered and 1 vulnerable tree species in this site.

Keywords: abundance, diversity, trees, palms

EFFECT OF ORGANIC SILAGE ON THE GROWTH AND DEVELOPMENT OF VERMI BIOMASSS [A/]

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Abstract

Earthworms are the major soil fauna that are now considered the potent modulators or decomposers of the physicochemical properties of the soil. It contributes to the reduction of surface litter, enhanced spatial heterogeneity, and increased microbial activity. Recently, earthworm is cultured and mass produced for vermicompost and vermimeal production. The supply of this biomass, however, is very limited so there is necessity to raise this in artificial condition. But growing earthworms is very critical because it easily dies and even migrates once the food is not enough or depleted. There are various practices to increase or bolster biomass production such as adding of the fermented organic matter into the natural food substrates to double or increase worm population in just 30 days. The good source of organic materials for silage production are the rotten fruits, vegetables, fish wastes, and trash fish which are often dumped into the sea or garbage waste or even scattered anywhere in the market place. The production of organic silage from these trashes could be beneficial to the worm because it serves as food supplement for the worms grown in artificial condition. The study revealed that the population of earthworms cultured in boxes or semi-natural conditions was significantly higher on boxes supplemented with fermented organic silage compared in boxes with just the natural food substrates available. The population of juvenile worms after 30 days was found high with active, sturdy, and robust worms. Further, the food supplement was able to contain the migration of matured worms at 67%. The production of this organic silage as food supplement for the vermi was beneficial as growth regulators of worms grown in artificial condition. The fermented organic silage was also able to sustain the growth of juvenile worms until maturity because the fish and vegetables are carbohydrates and protein rich laden food resources.

Keywords: silage, biomass, vermi

Interfacing with Nature Paper Abstracts

A DANCE AT THE SOUTH: ITS CULTURAL SYMBOLISMS AND IMPLICATIONS TO FITNESS

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Abstract

The movements and elements that are portrayed in any Philippine dance are always associated with the biological and physical environments, nature of the people and their ways of living. It is the objective of this paper to: 1) to describe the dance called "Pangalay ha Agong", 2) to analyze its symbolism in terms of movements and props used; and 3) to determine its contribution to the fitness of the dancers specifically the wrists and the fingers. Secondary data were used to analyze the movements and personal interviews were also conducted in order to elaborate the concepts that were discussed in this paper. This dance from the south of the Philippines has been used by the local people to celebrate their festivities. Changes were observed in the use of modern musical rhythms and instruments used. The circular movements of the hand/wrist helped the dancers attain the strength and endurance needed during the dance. In spite of the recent developments and variations, the dance steps of Pangalay ha agong had been retained.

Keywords: agong, dance, Janggay, Kontaw-Silat

ANTICLASTOGENIC EFFECTS OF BANABA (*LAGERSTROEMIA SPECIOSA)* AND VIRGIN COCONUT OIL (*COCOS NUCIFERAS*) ON THE CHROMOSOME BREAKING POTENTIAL OF TETRACYCLINE-INDUCED SPRAGUE DAWLEY RATS

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Abstract

Herbal medicine is the use of natural herbs from plants for the treatment and prevention of diseases. Numerous studies had been done in Banaba *(Lagerstroemia speciosa)* and its active ingredient called corosolic acid is a potent compound that has insulin-like effect to lower glucose in the body. Virgin Coconut Oil (VCO) is rich in lauric acid, an essential fatty acid that is found in high concentrations in mother's milk.

This study was undertaken to determine the anticlastogenic effects of Banaba decoction and VCO using the Micronucleus Test. Thirty apparently healthy two-months old Sprague Dawley rats were used in this study. Treatments 1 and 2 were assigned as the negative and positive controls, respectively; while treatments 3, 4 and 5 were clastogen-induced using TCN at the rate of 0.5 ml/20 grams body weight and were treated orally with Banaba decoction, VCO and combination of Banaba and VCO at the rate of 10 ml per animal per day, respectively. Treatment period was for a period of four. Data were analyzed using the analysis of variance of Complete Randomized Design (CRD) while treatment means were analyzed using the Least Significant Difference at 1% level of significance.

Results of the study revealed that both Banaba and VCO were capable to reduce significantly (P<0.01) the number of MPCEs in clastogen induced rats which indicates their 'anticlastogenic activity'. The positive control had more than thrice the number of MPCEs with 11.67 compared with rats given VCO, Banaba, and combination including the negative control (P< 0.01) which was not clastogen induced. Further studies on the chemical substance found in Banaba and VCO that can shield the interaction of TCN with base pairs in DNA thereby preventing the chromosomal breaking activity of TCN need to be investigated.

Keywords: anticlastogenic, *Lagestroemia speciosa, Cocos nuciferas,* chromosome, Sprague Dawley rats

MORPHOMETRIC PARAMETERS OF GENUS *CONUS* AND THEIR RELATIONSHIP TO FOOD TYPE

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Abstract

A multiple regression analysis was performed on data extracted from cone snails database of the Biology Department of the University of the Philippines Baguio to examine the relationship between food preference and the eight morphometric parameters of genus *Conus.* The researchers arrived with regression models that accounted up to 89% of the variations in food type of 867 cases. A parsimonious model using relative diameter and shape of generating curve can be used to predict food preference on genus *Conus*.

Keywords: cone snails, food preference, morphometric parameters, regression analysis

REEF RESTORATION FOR SPECIES CONSERVATION AND CLIMATE CHANGE ADAPTATION: THE BOLINAO EXPERIENCE

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Abstract

The Philippines lies in the world's center for marine biodiversity where 495 species of hard corals have been documented so far. However disturbances, whether natural or anthropogenic, chronic or episodic, have significantly decimated coral populations. The 200 km^2 Bolinao-Anda reef complex in the northwestern Philippines supports one of the most important fishing grounds in Luzon, the Lingayen Gulf.

The live coral cover of the reefs, documented since 1978, has shown a significant decrease over the years due to blast fishing, a massive coral bleaching event in 1998 and outbreaks of the crown-of-thorns starfish, *Acanthaster planci*. Since 2005, 3 research projects focusing on reef restoration have been initiated in the Bolinao-Anda reef complex. The many-pronged approach of the projects to reef degradation included: developing cost-effective restoration methods, propagating corals from various developmental stages (i.e., gametes, larvae, juveniles, and sub-colonies) and transferring the technology to the various stakeholders (e.g., the local government, fishermen, and other coastal inhabitants) and involving them in reef restoration. In the long-term, it is hoped that the work produced by the research would: (1) help degraded reef areas recover naturally, (2) conserve populations of threatened coral species, (3) bring back locally extinct populations of corals and (4) increase reef resilience to the effects of climate change. This paper will be highlighting the most significant results from these studies.

Keywords: Reef restoration, corals, biodiversity, climate change

DNA BARCODING OF THE WHITE-COLLARED KINGFISHER *TODIRAMPHUS CHLORIS* (BODDAERT 1783) (ALCEDINIDAE) AND THE MOLECULAR PHYLOGENY OF THE ALCEDINIDAE USING THE MITOCHONDRIAL CYTOCHROME OXIDASE SUBUNIT I GENE

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Abstract

The White-Collared Kingfisher (*Todiramphus chloris*) is a resident Philippine bird species. The mitochondrial gene cytochrome oxidase subunit I (COI) was used to elucidate its phylogenetc relationship within Alcedinidae and to evaluate species divergence with its sister species, *Todiramphus sanctus*. Reconstructed phylogeny based on the COI show congruent results with previous studies of Alcedinidae, particularly the Daceloninae. Monophyly of the traditional subfamilies was established, but basal relationship among them was equivocal. Phylogeny was well resolved in some terminal taxa and provided evidence supporting the separation of *Todiramphus* from *Halcyon*. Species divergence was evaluated using the COI gene and results revealed a very close association between *T. chloris* and *T. sanctus*, with only 1.38% sequence difference. This is well below the proposed species threshold (2.7 %). However, review of current literature does not support lumping together of the two taxa and indicates that a species threshold concept is inappropriate in the highly divergent kingfisher family. This study also provided the first COI record for *T. chloris*. Monophyly of the species was established, supporting the use of barcodes for species discovery.

Keywords: molecular phylogeny, White-collared Kingfisher, Alcedinidae, cytochrome oxidase subunit I, DNA barcoding

CONTROL OF THE CLUB ROOT DISEASE OF CRUCIFERS BY *TRICHODERMA* SPP

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Research supported by Department of Agriculture – Bureau of Agricultural Research

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Abstract

Three farmers in Buguias, Benguet modified the UPLB recommended club root disease management strategy and tried only the use of trichoderma microbial inoculant applied 0.125g m^{-2} at seedling stage as a control measure against club root disease of crucifers in addition to the use of chemical pesticides and compared this with their practice of using only chemical pesticides in cabbage and wombok. All inputs and cultural practices were the same in two farmers. One farmer reduced the use of material and labor inputs in plots where trichoderma inoculant was added, with all other cultural practices the same for both treatments. In all three farmers field disease incidence was very high in the conventional plots where only chemical pesticides were used. In plot where trichoderma inoculant was added, there was 50% reduction of disease incidence with every application of the inoculant, which shows that only trichoderma was able to control the disease but not chemical pesticides. Observation of roots of trichoderma-treated infected plants showed arrest of the disease and production of new roots allowing the continuous development of the crop resulting to high yields. New infection was also prevented. Analyses of partial production cost and partial gross financial returns show that Benguet farmers are losing as much as P32,000 (~ $711) in 0.25 ha field per cropping due to ineffective control of the disease by chemical pesticides. Disease incidence has worsened since last monitoring in 2007 with corresponding increase in cost production. The use of trichoderma inoculant for disease control results in 3X increase in farmers' partial gross income.

Keywords: club root disease, crucifers, trichoderma microbial inoculant, partial financial analysis

KEEPING IN STEP WITH THE UPLB CULTURE

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Abstract

The physical activity of walking has a tremendous impact on the fortitude and the productivity of a student in within the UPLB culture. The phrase "keeping in step" holds both a literal and metaphorical essence in the UPLB way of life Factors such as environmental conservation awareness, odd proximities of different classrooms, lack of public transportation, exercises and the need to preserve financial resources are some of the reasons for the prevalence of walking. The speed and ability to recover from covering the challenging UPLB terrain dictates the performance of a student in the succeeding academic and non-

academic activities. The factors that affect the quality of walking must therefore be identified and proven to improve this particular indispensable physical activity. This study is geared towards establishing the relationship of the strength and muscle endurance of the lower muscle groups to the speed of walking performance. Twenty-five (25) students who have been exposed to resistance training for a duration of four (4) months were tested for the strength and endurance of the quadriceps muscle through the 1 repetition maximum (1 RM) leg press test and the thirty (30) second endurance jump test respectively. The same subjects were observed in a five (5) km road race where alternate walking and jogging were executed.

Results reveal that the strength and endurance of the quadriceps muscle has a high level of correlation to the time results of the race which represents the efficiency of the walk. This study therefore reiterates that strengthening the quadriceps muscle is a necessary factor in the survival of a student in the UPLB culture and a vital contribution in lessening the individual carbon imprint in the environment.

Keywords: Walking, Strength, Endurance, Quadricep muscle, UPLB Culture

e-Environment
Paper Abstracts

AN INVESTIGATION ON BIODIVERSITY PERCEPTIONS OF STUDENTS ENROLLED IN ECOTOURISM AT SCHOOL OF HOTEL, RESTAURANT AND INSTITUTION MANAGEMENT, DE LA SALLE – COLLEGE OF SAINT BENILDE

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Abstract

As an important component of ecotourism, it is imperative to investigate student's constructions of related concepts of biodiversity like classification and variation in living things and ecosystem elements and the conceptual framework of biodiversity in relation to ecotourism and determine its educational implications. The population of the study consisted of students enrolled in Ecotourism Class Section HAH for 1st Term, School Year 2010-2011. A questionnaire was provided and focus-group discussion was conducted for clarification purposes. Student's constructions of biodiversity concept were determined using modified 'Conceptual Understanding of the Living Things and Classification (CULC) test". The conceptual framework of biodiversity in relation with ecotourism was investigated using a free word association test. Results were presented and discussed through qualifying themes in biology and biodiversity. Although biodiversity is a multidimensional concept, the participants were only focused on some of these dimensions – ecosystem and species diversity and exclusion of genetic diversity. Analysis of the free association test demonstrates that participants have a very basic and incomplete conceptual understanding on biodiversity in the context of sustainable development and ecotourism. This study may lead to a course material review and improvement for ecotourism and ecology educators at De La Salle – College of Saint Benilde -highlighting the importance of biodiversity in ecotourism. Thereby, curriculum improvement can be done with substantial basis.

Keywords: Biodiversity, Ecotourism, Perception

SELLING A FISH STORY: HOW FISHBASE CAN PROMOTE EFFECTIVE LEARNING OF ONLINE COURSES IN COASTAL RESOURCES MANAGEMENT

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Abstract

FishBase is a free, online information system that covers the biology and ecology of fish. Its use to promote effective learning of online courses in coastal resources management is explored in this paper. We present a framework for evaluating an online resource and apply the framework to FishBase. The use of FishBase can promote interactive learning in such courses as ichthyology, aquatic ecology and management-oriented courses such as aquatic resources management and integrated coastal management. Exercises using FishBase can also encourage distance learners to explore the physical environment, which in a sense replicates the laboratory and fieldwork that are normally regarded as reserved for face-to-face settings. FishBase also provides an opportunity to create and contribute knowledge, thus bringing the learning experience to a full circle. We conclude that if FishBase is judiciously exploited, the quality of online

courses in coastal resources management can equal if not exceed the quality of similar courses offered in the traditional, face-to-face mode.

Keywords: Fishbase, online courses, coastal resources management

ACCESS PATTERNS OF DE LEARNERS IN AN ONLINE COURSE: A LOG FILE ANALYSIS

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Abstract

The interactive capacity of the new version of the worldwide web allows the online delivery of content knowledge. However, there is a need to study the access patterns of online learners to identify learning transactional support, and limit learning gaps. The study analyzed the behavior of online learners (n = 23) by using log file analysis. Four pre-determined variables, namely, number of visit (nov), time of visit (tov), length of visit (lov), and number of internet protocol (IP) address used (nip) were measured and analyzed from an undergraduate natural science course for one semester. These variables were analyzed against age, working status, and internet access of the learners. The log file analysis generated 6,107 unique visits in the course site. On the average, an online learner visits 265 times in a semester, and is spending an estimated 19.56 hours in the course site. Learners are more active during the night (nov_{night} = 3,366) than during the day (nov_{day} = 2,895), and spent more time at night (lov_{night} = 5.78 hrs) than on day (lov_{day} = 4.46 hrs). Each learner accessed the course site by using an average number of 46 different IP addresses. Working learners are understandably less active (nov = 220) than non-working (nov = 325), and mostly active during the night (nov_{night} = 109) than on day (nov_{day} = 81). Though age did not affect the choice of the time of visit, learners' internet connection (either at home or elsewhere) showed significant influence ($p < 0.05$). These patterns can help online educators evaluate and assess learners' learning process, track learners' actions, and develop support system to address learning divides.

Keywords: online course, distance education, logfile analysis

DELIVERING ENVIRONMENTAL COURSES THROUGH ONLINE LEARNING

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Abstract

The advent of online learning has made possible the further widening of access to UP Open University programs including that of the Master of Environment and Natural Resource Management (MENRM) program. As the only graduate program in the Philippines that is offered through online learning, this paper takes a closer look at the potentials of MENRM in sharing knowledge about environmental issues and by providing solid grounding in environmental resource management. This paper thoroughly examines the online delivery of MENRM program and shows the evolution and development of its course delivery as well as course development from purely print-based to online learning. This paper shares the UPOU's experience in offering an environmental graduate program as well as in dealing with the challenges of ensuring quality education.

Keywords: Online learning; distance education; information and communication technology; environment and natural resource management; graduate program

Poster Paper Abstracts

CHANGING THE ECOLOGICAL NICHE OF COPRINUS COMATUS FROM A WEED FUNGUS TO A NUTRICEUTICAL AND BIOCLEANSING AGENT

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Abstract

Coprinus comatus is an edible fungus that normally inhabits cellulosic substrates like rice straw with appreciable amount of nitrogen. This is considered as a weed fungus by the rural-based *Volvariella* growers in the country due to its rapid growth on mushroom beds. Thus, despite of its edibility, this mushroom is oftentimes ignored in the mushroom industry. Our research team initiated a study to harness the economic potential of this edible mushroom. The growth performance of *Coprinus comatus* on different pulp and paper waste formulation was evaluated. Observations were based on the best substrate having shortest incubation period, initiation of primordia and development of fruiting bodies. The ability of *C. comatus* as biocleanser of Pb –contaminated pulp and paper waste was also highlighted. The chemical components of the different pulp and paper waste were determined before and after cultivation under aseptic condition.

Among the six pulp and paper wastes-based formulations, only brown pulp contains Pb with 48 ppm. This Pb - contaminated substrate was used in evaluating the ability of this mushroom to uptake this heavy metal. Our investigation revealed that 16.15 ppm was only detected on the dried fruiting bodies of *C. comatus* after it was grown on Pb – contaminated substrate. The remaining 3 formulations were used as substrates for the production of the fruiting bodies of *C. comatus* in a miniaturized glass container under aseptic condition. Results of the evaluation disclosed that *C. comatus* cultured on fine gray pulp with 50% rice straw and 10% rice bran and coarse pulp with 50% rice straw and 10% rice bran registered the shortest incubation period with the same mean of 11 days. The longest incubation period was recorded in light blue pulp with 50% rice straw and 10% rice bran with a mean of 17 days. Moreover, light blue pulp with 50% rice straw and 10% rice bran produced the heaviest fruiting bodies with a mean of 8.85 g.

Key words: *C. comatus*, pulp, lead contaminated

PARADIGM SHIFT ON MUSHROOM TECHNOLOGY FOR LIGNINOLYTIC FUNGI IN THE PHILIPPINES: FROM SAWDUST TO RICE STRAW

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Abstract

The Philippines being a tropical country is rich with forest product resources. The most common botanical-based forest products which are oftentimes used by the Filipinos for commercial purposes include

bamboo, rattan, dipterocarp – based lumber for furniture making, wild fruits and epiphytes. Though mushrooms in other developed parts of the world serve as one of the primary forest products and are highly considered as prime commodity, these remained to be under utilized in the Philippines. Their scarcity of supply in the local market in their fresh forms makes these commodities luxury food on the table of Filipino families. With the favorable climatic conditions in the country during rainy season, mushrooms become seasonally abundant. These mushrooms are oftentimes injudiciously collected from the wild by the village people. However, due to the change of habitat as a result of unprecedented deforestation, climatic change and massive collection, occurrence of wild mushrooms started to diminish. In our efforts to conserve these wild fungal genetic resources, we have surveyed a number of wild mushrooms in the country and studied their biophysiology which lead to their successful domestication. We have been successful in rescuing the cell lines of these wild mushrooms and developed production technologies for *Auricularia polytricha, Collybia reinakeana, Schizophyllum commune* and *Ganoderma lucidum*. Though these mushrooms are generally known as wood rotters and are widely and commercially grown on sawdust-based medium, we were able to develop production technologies using composted rice straw as the basal medium. In practice, farmers customarily burn the rice straw in order to easily get rid of this agricultural waste. Understanding fully the biophysiology of these wild mushrooms, we successfully grew and produced higher biological efficiency on this basal medium. The use of rice straw as basal medium becomes a very wise strategy in order to discourage the burning of straw and minimize the dependency on sawdust for mushroom cultivation.

Keywords: *Collybia reinakeana, Ganoderma lucidum,* Philippine mushrooms, *Schizophyllum commune*

MORPHOLOGICAL CHARACTERIZATION OF INDIGENE|OUS RICE (ORYZA SATIVA L.) CULTIVARS IN SULTAN KUDARATI PROVINCE, PHILIPPINES

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Abstract

A study on the morphological characteristics and yield performance of indigenous upland rice cultivars in Sultan Kudarat was conducted to determine the grain yield, yield characteristics, and their reaction to pests and diseases. Eleven (11) indigenous upland rice cultivars and five (5) upland varieties (check) were planted during wet and dry season of 2008 to 2009. On the average, three indigenous cultivars: Kulaman, Bli and Kasagpi out yielded the check UPLRi7 (2677 kg/ha) with an average yield of 3410 kg/ha, 2978 kg/ha and 2,700 kg/ha, respectively. The differences in yield and yield components was primarily due to the cultivar performance and adaptability of the upland rice during wet and dry season planted in the Municipalities of Bagumbayan and Senator Ninoy Aquino.

Keywords: morphological classification, yield performance, upland rice cultivars, wet and dry Season

DIVERSITY OF TREES IN TWO MOUNTAINS IN ARAKAN VALLEY, NORTH COTABATO

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Abstract

The study was conducted from April 23 to May 8, 2008 in Mt. Sinaka and Mt. Mahuson, Arakan, North Cotabato in order to assess the abundance and diversity of trees present along the two study sites using quadrat and transect methods. In Mt. Sinaka, Salasang, Arakan, North Cotabato, a total of 97 identified and 17 unidentified tree species in 69 genera and about 39 families were collected and recorded along the three sampling sites corresponding to the three elevation gradients. Across the three sampling sites, *Shorea negrosensis* Foxw. is the most dominant, followed by *Shorea contorta* Vid. Calculations using Shannon-Weiner Diversity Index (H') reveals that the tree vegetation on this site can be classified as highly diverse.

A total of 79 identified and 16 unidentified tree species in 50 genera and 34 families were recorded along the three sampling sites in Mt. Mahuson, Ganatan, Arakan, North Cotabato wherein *Lithocarpus apoensis* (Elm.) Rehd. is the most dominant and has the highest importance value. The diversity value of trees in Mt. Mahuson is considered as moderately diverse. Three species are classified as critically endangered species, 3 endangered, 13 tree species are vulnerable, and 1 species is under the wildlife species category based on the DAO 2007-01 List of Threatened and Wildlife Species.

Keywords: diversity, quadrat, dominant, endangered

SURVIVAL RATES *Aedes aegypti* PUPAE UNDER FIVE LEVELS OF TEMPERATURE

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Abstract

The Philippines had been experiencing an increase in annual, maximum and minimum temperature by 0.14^{0}C from 1971 to 2000. Such trend, which is also similar worldwide, seems to be a factor in the steadily increasing incidence of viral insect-born diseases, such as dengue (WHO, 2000). In this paper, *Aedes* sp. pupae were subjected into controlled ambient temperatures ranging from 36^{0}C to 48^{0}C as the survival rates were stimulated within these temperatures. From a 120-hour of pupal incubation, it resulted that the temperature 36^{0}C sustained the highest survival rate and 38^{0}C is the optimum temperature for the emergence of pupa into adult. On the other hand at 44^{0}C and 48^{0}C, pupae were unable to emerge into adult which has tolerated the temperature for three hours only. These supports the premise established from several authors that mosquito development increases with temperature stress. In

general, mosquito density tends to increase with increasing temperature, giving rise to a concern regarding potential increase in mosquito related diseases, given a scenario of global warming.

Keywords: insect-born disease, dengue, global warming

INDIGENOUS FISH HUNTING PRACTICES AND MATERIALS USED BY THE PALAWA'NS IN FRESH WATER ENVIRONMENT AT BATARAZA AND QUEZON, PALAWAN, PHILIPPINES

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Abstract

This study was conducted to determine the indigenous practices of Palawa'n indigenous tribe in Bataraza and Quezon, Palawan. Specifically; the study was conducted to determine the materials used in catching fish. The study revealed a very interesting observation that even in fresh water environment like a river or stream, fish corral is still being established by the indigenous people to catch fish using indigenous materials such as the leaf petioles and rachises of *Arenga ambong* Becc and a strong vine for tying. Other methods used are the fish trap using the same materials of the leaf and rachises of *A. ambong* and different species of rattans and bamboos. The common methods used are hook and line and fish scoop made of fish net. The three methods aside from the fish corral were the common methods utilized by both men and women. For fish corral however, men were the ones utilizing this method because it entails hard labor and skills in the construction of fish corral. Other practices of fish catching such as fish poisoning using chemicals and even botanical pesticides or fish poison were not included in this study

Keywords: Fish hunting, Palawan, Fresh water

CLIMATE CHANGE AND INCIDENCE OF DENGUE FEVER (DF) AND DENGUE HEMORRHAGIC FEVER (DHF) IN ILIGAN CITY, LANAO DEL NORTE

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Abstract

Dengue has been and is still a serious public health problem in Iligan City, Lanao del Norte. The increase of the number of dengue cases has been attributed to climate change; however, contradicting reports show uncertain relationships between dengue and climatic factors. This study showed the relationships between climatic factors with dengue fever (DF) and dengue hemorrhagic fever (DHF) incidence reported in Iligan City from 2005-2009. The climatic factors include maximum temperature, minimum temperature, rainfall and relative humidity. Pearson's correlation was used to explore the primary association between the DF and DHF incidences and the preceded climatic factors. Multiple regression

analysis was also used to fit the statistical model. The result showed that the total number of dengue cases (both DF and DHF) used as the dependent variable gave a predicted regression model of *Y(dengue incidence) = 321.331 -.307 (temp max) + .375 (temp min) + 0.24 (rainfall)- .323 (relative humidity)* which means these constants have a significant correlation to dengue cases suggesting that an increase or decrease of its values could affect the number of dengue cases.

Keywords: Dengue, Dengue fever, dengue hemorrhagic fever

ANTIBACTERIAL ACTIVITY OF THE CRUDE EXTRACTS FROM THE RINDS AND SEEDS OF NATIVE DURIAN (*Durian zibethinus*) AGAINST HOSPITAL ISOLATES OF *Escherichia coli* AND *Staphylococcus aureus*

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Abstract

The increasing resistance of microorganisms to many commercially available antimicrobial agents leads to the search for new sources of antimicrobial solutions that are effective and at the same time affordable. Thus, this study was conducted to determine the antimicrobial property of the seed and rind of the native durian (*Durio zibethinus*).

The effect of the crude extracts obtained from the durian seed and rind against the growth of two hospital isolates of *Staphylococcus aureus* and *Escherechia coli* was evaluated. Durian samples were collected from the local durian seller at Mahayahay, Iligan City. The seeds and rinds obtained were then dried and ground. About one kilogram of powdered samples was soaked in methanol. The samples were then subjected to the rotary evaporator and the recovered extract, which is undiluted, was considered having 100% concentration while the other concentrations were prepared using methanol as diluents. Using the Disc Diffusion technique, the crude extracts from the rinds and seed with 100%, 75%, 50%, and 25% respectively were tested against *E. coli* and *S. aureus*. Chloramphenicol served as the positive control and methanol as the negative control. Zones of inhibition were measured after 24 hours. It was observed that both crude extracts of the durian rind and seed exhibited inhibitory effects on the two test organisms. Both extracts exhibited greater zones of inhibition on *E.coli*. The results showed that the crude extracts obtained from the native species of *D. zibethinus*can be a source of an antimicrobial agent.

Keywords: antimicrobial, Disc Diffusion technique, Crude Extracts

Bt and BtRR Corns Potential Impact on Invertebrate Species, Abundance and Richness in Isabela Province, Northeast Luzon, Philippines

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Abstract

A farm-scale study was conducted in three major corn-producing towns of Isabela, Northeast Luzon, Philippines to determine the beneficial or detrimental impacts of commercially cultivated genetically modified (GM) corn varieties on the agro-ecosystem's health. Specifically, it evaluated the potential effects of GM corn varieties (Bt and BtRR) on the abundance, richness and species of different types of invertebrate dwellers found within the corn fields. Results showed that among the corn varieties, there were significantly more abundant and high species richness of invertebrates accounted for in non-Bt corn compared to Bt and BtRR corn. Non-Bt corn statistically showed more abundant in aerial and soil fauna invertebrates than in Bt and BtRR corn. Statistically, surface dweller abundance had no significant differences in all corn varieties. Species richness of aerial dwellers was significantly high in non-Bt corn while non-significant differences were obtained for the species richness of surface and soil fauna. Finally, among the species, no-tillage BtRR corn fields significantly favoured *Lumbricoides sp.* Monoculture crop like Bt corn benefited hervibores species like *Dermestes sp. and Rhagolletis pomonella.* Species *Micraspis discolour, Aphidelastes sp.* and *Oxidus gracillis* were significantly less abundant in Bt corn and significantly more abundant in non-Bt corn.

Keywords: Invertebrate, genetically modified corn, species richness, Abundance

LABORATORY EVALUATION FOR CONTROL: EFFECTS OF ENTOMOPATHOGENIC FUNGI *Beauveria bassiana* Bassi and *Metarhizium anisopliae* Metchnikoff ON FILARIASIS VECTOR *Culex quinquefasciatus* Say (DIPTERA: CULICIDAE)

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Abstract

Entomopathogenic fungi, *Beauveria bassiana* and *Metarhizium anisopliae* are known to cause mycoses or fungal diseases on various pests. In this study, such fungi were used and tested as agents in controlling the spread of filariasis through controlling the disease vector, *Culex quinquefasciatus*. This study principally aimed to evaluate the effects of both fungi under laboratory conditions. Two bioassays were performed and in both bioassays, different conidia suspensions of the entomopathogenic fungi were produced and treated on the larval and pupal stages of *Culex quinquefasciatus*, bioassay 1 and bioassay 2, respectively.

Results showed that in bioassay 1, treated larval stages of *Cx. quinquefasciatus* onto $1.0x10^7$, $1.0x10^6$ and $1.0x10^5$ conidia/ml concentrations, M. *anisopliae* treatments are only significant in terms of its exposure

period with p=0.000, and concentration shows no significance. On the other hand, *B. bassiana* treatments are both significant in terms of the exposure period and concentration with p values equal to 0.003 (p=0.003). Furthermore, when both fungi were compared statistically, it revealed significance in length of exposure (p=0.000) and in concentration (p=0.001). In bioassay 2, treated pupal stages of *Cx. quinquefasciatus* onto $1.0x10^8$ and $1.0x10^7$ conidia/ml concentrations, results showed that, *Metarhizium anisopliae* treatments have no significance at all, but in *Beauveria bassiana* treatments, it showed significance in terms of concentration with p=0.005. Therefore, both *B. bassiana* and *M. anisopliae* have lethal effects onto the filariasis vector, *Culex quinquefasciatus*, with *B. bassiana* causing high lethality, thereby causing high mortality rates in both larval and pupal bioassays.

Keywords: entomopathogenic, filariasis, bioassays

SOCIAL SYSTEM AND AGRICULTURAL BIODIVERSITY PERSPECTIVES OF THE IBALOIS' OF TUBLAY, BENGUET

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Abstract

This is a descriptive-correlational study comparing the socio-agro-biodiversity relationship in two relatively varying indigenous communities of Tublay, Benguet (Barangay Daclan and Central). Barangay Daclan was perceived to have lesser indigenous practices than Barangay Central. It is experiencing a continuous modification on its social orientation, due to the consistent external interventions and internal modifications. These changes hasten aggressive farm management transitions, which directly affects farm biodiversity. Results signify that indigenousity has a direct relationship with perceived native farm floral diversity. Barangay Daclan, which is less indigenous, has significantly lower agro-biodiversity than Central. Further, farm management has a very strong influence to biodiversity. Barangay Central, which is a subsistence community and practicing perennial farming, has higher indigenous floral diversity than Barangay Daclan.

Respondents opined that education, and accessibility and reactivity of the place are the most influential occurrence that accelerates social modification, which in turn lead to serious agro-biodiversity decline. On one hand, financial benefit is the main constraint of the indigenous farming system, which facilitates the shift from traditional to commercial farming. This conversion demands major alterations on the strategies, giving much pressure to the indigenous system. These pressures had disrupted the indigenous orientation of the people manipulating them to stay off the diversified traditional farming system. Farmers budged to commercial crops, looking on financial aspect as the sole indicator of benefits, discounting the socio-ecological implications especially farm sustainability.

Keywords: Agro-biodiversity, Indigenous practices, Indigenousity

INDIGENOUS PLANT UTILIZATION IN THE MATERIAL CULTURE OF KANKANA-EY IN KIBUNGAN, BENGUET, CAR

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Abstract

This study was primarily concerned in identifying, classifying and describing local plant resources traditionally used by Kankana-ey indigenous people in Kibungan, Benguet. Specifically, plants commonly used for material use such as in house building, textile production (clothing), handicraft and implement or tool making, body ornaments, and musical instruments. The study utilized survey method. Only adults (aged 18 and above) preferably elder native individuals were selected as respondents in the study. A total of one hundred Kankana-ey individuals were interviewed. Ranking was utilized to determine which among the plants is mostly or commonly used. Results showed that in traditional house building, handicraft, tool making, and musical instrument, bamboo species belonging to genera Bambusa, Gigantochloa, Schizostachyum are ranked 1. These are the most predominantly used plants as raw material. The least commonly used in house building is waka (Calamus spp.) while tikim (N. vidalii) in handicraft and tool. In traditional textile, balayang (M. errans) is the most predominantly used plant. The least used are niyog (C. nucifera) and bulak (G. hirsutum). In traditional body ornaments, taktakayan (C. lachryma jobi) is ranked 1 and is therefore, the most predominantly used as body ornament. Cogon (I. cylindrica) and bayabas (P. guajava) are the least used plants as body ornament and in traditional musical instrument respectively. Over all, results show that bamboo species are widely used by Kankana-ey individuals in Kibungan, Benguet for various material purposes making them one of the most important natural resource in the region. This study recommends further research to be carried out specifically on the comparison between and among the material culture of indigenous tribes of Benguet and in the entire country. Thus, to determine similarities and differences in the raw materials used for house building, handicraft and tool making, textile production, body ornaments and lastly, musical instruments.

Keywords: Plant Utilization, Material Culture, Kankana-ey, Ethnobotany

PRELIMINARY PHYCOCHEMICAL SCREENING AND ANTIOXIDANT ACTIVITY OF SOME *SARGASUUM* SPECIES FROM EASTERN SAMAR, PHILIPPINES

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Abstract

Methanolic extracts of some Philippine *Sargassum* species (*S. crassifolium*, *S. polycystum*, *S. gracillimum*, *S. hemiphyllum* and *S. cristaefolium*) were evaluated for their phycochemical constituents and antioxidant properties. The presence of alkaloids, flavonoids, tannins and saponins was qualitatively screened. Total phenolic content was determined using Folin-Ciocalteu reagent in terms of gallic acid equivalents (GAE). Antioxidant activity was evaluated using diphenyl -1, 2-picryl hydrazyl (DPPH) free radical scavenging activity assay, and Fe^{2+} chelation ability. Phycochemical studies showed presence of flavonoids, saponins and alkaloids in *S. cristaefolium*. Highest total phenolic content was observed in *S. cristaefolium* (40.8±2.3 mg GA/100 g dry weight). At their highest concentration (100 mg/mL), all algal extracts showed considerably lower free radical activity than ascorbic acid (90.9%) and butylated hydroxyanisole (BHA) (74.7±1.9%). *S. hemiphyllum*, *S. polycystum*, and *S. cristaefolium* showed strong Fe^{2+} chelation ability at 61.2±3.0%, 54.0±0.9%, and 51.8±5.6%, respectively. The results further reveal that free radical scavenging activity and Fe^{2+} chelation ability of the extracts were all dose-dependent.

Keywords: *Sargassum*, free radicals, antioxidants, methanolic extracts

HARNESSING THE EMERGENCE OF SCIENCE AND TECHNOLOGY FOR NATURE CONSERVATION: BRIDGING THE EPISTEMIC-PHRONETIC DIVIDE

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Abstract

The ongoing environmental destructions and even climate changes are predominantly and undeniably due to the incessant and unmindful human-induced activities, and apparently because of the great dichotomy between the human *epistemic* and *phronetic* domains of the emerging science and technology. Harnessing the emergence of science and technology for the conservation of nature will continue to be stalled if this *epistemic-phronetic* divide continues to widen and be ignored in the process. Further, in this presentation, it is asserted that humans must appropriately understand the repercussion of what they *know* and correctly *apply* it. Hence, true information of knowledge coupled with its appropriate understanding, especially its application for nature conservation, should result in the rectitude of human action anywhere on anything and on anyone at any time.

Keywords: science and technology, epistemic, phronetic, nature conservation

ETIOLOGY OF STEM ROT OF COFFEE AND CONTROL OF ITS CAUSAL PATHOGEN

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Abstract

Results showed that stem rot of coffee at USM is caused by *Sclerotium rolfsii*. Pathogenicity test revealed that the fungus was pathogenic to stem cutting of coffee. First noticeable symptom of infection was girdling at the base of the stem where it was in contact with the soil and eventually encircled the plant stem at 5 DAI. In vitro test revealed that OBCAs (CoMT, HMT and VT) significantly inhibited the growth of *S. rolfsii* after 72 hr of incubation similar to the effect of AZ41 (organic check), *Trichoderma* (Biocon) and Benomyl (chemical check). OBCAs applied either as protectant or eradicant after four and three cycles at seven days interval, respectively, reduced percentage infection and percentage severity infection and afforded control of stem rot of coffee comparable to the effect of AZ41 (organic check), *Trichoderma* (Biocon), and Benomyl (chemical check). Application of OBCAs (MdCT, GT, VT, HMT, CoMT and CaMT) either as protectants or eradicants can reduce % DI and control stem rot of coffee hence, can be used as substitute to synthetic pesticides. These are organic-based hence, safe and environment-friendly.

Keywords: *Sclerotium rolfsii,* OBCAs (Organic Based Control Agents), Stem rot

BIOEFFICACY OF SEVEN ANIMAL MANURE TEAS AGAINST Helminthosporium *hevea* Petch. CAUSING BIRD'S EYESPOT OF RUBBER SEEDLINGS

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Abstract

Result of the *in vitro* test revealed that seven animal manure teas significantly inhibited the growth of *H. hevea* with DZI (diameter zone of inhibition) means ranging from 24.83 to 62.33mm after 72 hr of incubation. Among the test manure teas, Guano tea gave the highest degree of efficacy (very effective) against the pathogen and comparable to *Euphorbia heterophylla* (organic check) and Mancozeb (chemical check). The symptom of bird's eyespot on RRIM 600 rubber seedlings which appeared at 5.33 to 7.00 was significantly delayed by the application of test manure teas. Four cycles of eradicative spray application of manure teas (CaMT, GMT, CMT, GT, and HMT) significantly reduced %DI of bird's eyespot compared to untreated control, all rated moderately effective (ME) while *E. heterophylla* (organic check), effective (E) had comparable %DC with Mancozeb (chemical check) rated very effective (VE). Production cost/thousand rubber seedlings to manage bird's eyespot on the nursery was relatively higher with the use of Mancozeb

(chemical check) compared to the use of all test manure teas. The latter were economical safe, effective, and environment-people-friendly control against the disease.

Keywords: *Helminthosporium hevea* Petch. , Animal Manure Teas, Bird's Eyespot of Rubber

INCIDENCE OF DISEASES IN RUBBER NURSERIES AND BUDWOOD GARDENS

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Abstract

This study aimed to determine and document the incidence of diseases in rubber (*Hevea brasiliensis*) nurseries and budwood gardens in the provinces of Laguna, Quezon, Pampanga, Tarlac, Palawan, and Southern Leyte. Survey results revealed nine diseases were found from all the provinces surveyed above. These diseases were leaf blights caused by *Fusarium oxysporum*, *Corynespora cassicola*, and *Phytophthora palmivora*, anthracnose caused by *Colletotrichum gloeosporioides*, bird's eye spot caused by *Helminthosporium heveae*, powdery mildew caused by *Oidium heveae*, stem bleeding due to *Botryodiplodia theobromae*, seedling blight possibly due to a bacterium, algal spot due to *Cephaleurus virescens*. These diseases were noted in Lucban province of Quezon (Southern Luzon State University). It was also noted that RRIM 600 rubber clone was the most susceptible clone, commonly planted and propagated in the rubber-growing provinces surveyed.

Keywords: *Hevea brasiliensis, Fusarium oxysporum*, *Corynespora cassicola*, *Phytophthora palmivora, Colletotrichum gloeosporioides*, *Helminthosporium heveae*, *Oidium heveae*, *Botryodiplodia theobromae, Cephaleurus virescens*

EFFICACY EVALUATION OF OBCAs AGAINST *Colletotrichum gloeosporioides* Penz. CAUSING ANTHRACNOSE LEAFSPOT OF RUBBER SEEDLINGS

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Abstract

Results of the *in vitro* efficacy test against C. *gloeosporioides* causing anthracnose of rubber revealed that three OBCAs (IMO, Garlic extract, and Holy basil extract) exhibited comparable effects with Propineb (organic check) and Mancozeb (chemical check) in inhibiting the growth of C. *gloeosporioides* based on mean diameter zone of growth (mm). The *in vivo* efficacy test revealed delayed symptom development and reduced %DI of anthracnose leafspot on plants protectively treated with garlic extract and holy basil extract

comparable to the effect of Propineb (organic check) and Mancozeb (chemical check). Of the eight test OBCAs, one test OBCA, Holy basil extract was found significantly exerting both protective and eradicative action against *C. gloeosporioides* causing anthracnose leafspot of rubber seedlings. The production cost/thousand nursery rubber seedlings using test manure teas to manage anthracnose leafspot of rubber was relatively higher with the use of Mancozeb (chemical check) compared to the production cost incurred with the use of test OBCAs. The latter was not only effective but also cheap or economically safe to use and locally available hence, healthy alternative to synthetic chemicals.

Keywords: *Colletotrichum gloeosporioides,* OBCAs (Organic Based Control Agents), Anthracnose Leaf spot of Rubber

WATERSHED CHARACTERIZATION OF ILIGAN RIVER

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Abstract

The Iligan River watershed characterization was conducted in Iligan City, Lanao del Norte from October 11-22, 2009 using transect walk method for biodiversity assessment while vegetation sampling was conducted using quadrat and greenline composition sampling methods. A total of 19 barangays of Iligan City are in the watershed, and 28 more barangays of Lanao del Norte and Lanao del Sur are partially within the watershed divide. Water quality assessment were conducted in the laboratory of Iligan City Waterworks System while fecal coliforms were analyzed in the MSU-IIT microbiology laboratory. Thematic maps of 2005 Comprehensive Land Use Plan (CLUP) of Iligan River watershed were also used as secondary data in the characterization process.

The watershed basin has 41 streams comprising all stream orders. The bifurcation ratio (Br) between 2nd order and 3rd order stream is high, which mean that the water discharges are low. In every 3rd order stream, there are about 8.5 streams draining to the main channel. The stream density of the watershed is 0.232 stream/km^2. The watershed is characterized mainly by parallel pattern where tributaries flow parallel to each other. Iligan River watershed also has a shape factor of 0.18 which describes that the watershed is relatively elongated though its width is quite hefty. Drainage density (Dd) of the watershed implies that a channel length of 0.56 km is available to drain the waters coming from 1 km^2 of land. Soil erosion within the watershed is described as from no apparent erosion to severe erosion. This is due to the steepness of terrain in some portions of the watershed and the continuous intensive farming. Most of the greenbelt composition along the riverbank is cultivated with banana and coconut trees, along with some plantation of some agricultural plants such as talong, upo, and pipino. Napier grasses (*Pennisetum purpureum*) are also dominant. Among the five sample sites, Pugaan and Tambacan were found positive for the presence of *Echerichia coli* due to dense population and with the use of the river as a natural latrine. This finding is supported by the presence of human fecal matter in the beaches and other areas.

Keywords: density, erosion, stream order, watershed

CLADISTIC ANALYSIS OF THE FAMILY POACEAE COLLECTED IN ILIGAN CITY

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Abstract

The study was conducted to know the phylogenetic relationships of the grass species present in Iligan City. The species were identified based on their floral characteristics. These characteristics were used to construct a cladogram that will help to determine the relationships between grass species. There were 40 identified grass species that were identified and collected in Iligan City. The collected grass species belong to tribes Chlorideae, Zoysiaeae, Eragrosteae, Maydeae, Arundinelleae, Andropogoneae, Paniceae, Isachneae, Poeae, and Oryzeae. A floral morphology cladogram of the collected grass species was constructed using the PAST software which showed two major cluster groups of grasses: the monoecious and dioecious. Species of the Tribe Maydeae formed the monoecious group, which appeared to be the basal group of the dioecious plants that comprised the tribes Eragrosteae, Paniceae, Chlorideae, Andropogoneae, Arundinelleae, Oryzeae, Poeae, Isachneae, and Zoysieae. Both of the groups were supported by 100% frequency of occurrence.

Keywords: cladistics, cladogram, phylogeny, Poaceae

INNOVATED MULTIPURPOSE SLIDE TABLE CIRCULAR SAW WITH ROUTER

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Abstract

Machine flexibility is the emerging keyword in the woodworking industry these days. It is a feature wherein a woodworker can shift to another function of the machine that fits best to the required job instantly. Rapid changeover and speed in the operation of machine tool are factors for productivity of woodworking machines. This study innovated a conventional table circular saw into a versatile sliding table saw for furniture and cabinet shops at low cost. The construction, acceptability of the design, and effectiveness of an Innovated Slide Table Circular Saw and Router as a machine and as instructional equipment were the focus of the study. The innovated circular saw with router is powered by an electric motor to function effectively for panel board cutting, solid wood cutting, and routing wide areas. The tool is highly acceptable in terms of its design and construction, and functionally effective, as evaluated by experts. T-test results, at 5% level of significance, revealed a significant mean difference in the performance test results of woodworking students taught with the use of the conventional circular saw and the students taught using the innovative multipurpose slide table circular saw and router, gaining higher competence. Thus, an effective instructional/innovated equipment for Furniture and Cabinet Making (FCM) technology.

Keywords: innovation, wood working, circular saw router

INFLUENCE OF SAWDUST CONCENTRATION ON THE QUALITY OF CLAY BRICKS

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Abstract

Clay is one of the most abundant natural mineral materials on earth particularly in Danao City. Clay, for brick manufacturing, must possess specific properties and characteristics, i.e. plasticity, wet and air-dried strength. This resource can be depleted if continually utilized. Thus, there is a need of an alternative material for bricks manufacture, like sawdust, to be added to clay. An experiment was conducted to manufacture clay bricks with the varying concentration of sawdust, that is, 10%, 20% and 30% by volume. Surface texture properties were subjected descriptive method, while the compressive strength of each treatment was tested at Universal Testing Machine (UTM). Clay bricks without sawdust had a surface texture mean score of 1.96, described as slightly granular. Clay bricks with 10% and 20% sawdust had mean scores of 2.56 and 3.00, respectively, described as granular. Bricks with 30% sawdust had a mean score of 3.64, described as slightly smooth. Hence, the more sawdust incorporated into the clay bricks the better the texture of the product. For compressive strength tests, clay bricks with 20% sawdust had a higher compressive strength. Based on findings, 20% sawdust by volume is appropriate to be mixed with clay for use in brick manufacturing.

Keywords: clay, bricks, sawdust, compressive strength.

EVALUATION ON THE PERFORMANCE OF OIL PALM APPLIED WITH INORGANIC FERTILIZER BASED ON LEAF AND SOIL ANALYSIS AS FERTILIZER RECOMMENDATION

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Abstract

Oil palm farmers are faced with the problem of applying fertilizer without the benefit of either soil analysis or leaf analysis. With this situation no exact amounts and kind of fertilizer applied which limit plant productivity. This study was undertaken to evaluate the yield and performance of oil palm applied with inorganic fertilizer where in the basis for recommendation are based on leaf and soil analysis. Results shows that the highest weight of 98.4 kg. observe last July was noted on oil palm fertilized with FRR based on soil analysis followed by a comparable mean of 89.8 and 89.6 observed in plants applied with fertilizer based on ½ FRR based on leaf analysis + ½ FRR using soil analysis. For the month of September oil palm fertilized with FRR using leaf analysis obtained the highest weight of fruit bunch with a mean 117.46 kg followed by a comparable mean of 110.68 observed from plants fertilized with ½ FRR using leaf analysis + ½ FRR using soil analysis. In all observation, unfertilized plant exhibited the lowest weight of fruit bunch which ranged from 74 kg to 102.42 kg for three times observation. The application of inorganic fertilizer

based on the combination of leaf and soil analysis significantly increased the weight of fruit bunch of oil palm.

Keywords: oil palm, inorganic fertilizer, soil analysis, leaf analysis, yield, fruit bunch, fertilizer

NITROGEN MINERALIZATION IN ORGANIC CARROT PRODUCTION

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Abstract

Application of organic fertilizers to soil is increasing as means of improving soil organic matter (SOM) content in low fertility soils, and environmentally favorable waste management strategy. Organic amendments vary greatly in their composition and degree of stabilization and thus their capacity to release nutrients. Nitrogen for crops comes from many sources, one of which is mineralization of organic matter and crop residues. The study evaluated nitrogen mineralization of different organic fertilizer on soils grown with carrots, its effects on yield and soil properties. Soil amended with chicken manure had high nitrogen mineralization at 30 Days After Sowing (DAS). A sudden decrease was obtained at 50, 70, and 90 DAS attributed to nutrient uptake of carrots. It appears that peak release of N was at 30 DAS. Nitrogen uptake of carrots was higher from application of 6 tons/ha chicken manure at 30 DAS and continued to increase at 50, 70 and 90 DAS. Improved soil organic matter, pH and bulk density were noted from application of different organic fertilizers. Higher soil organic matter was obtained from 20 tons/ha vermicompost. Marketable and total yield were heavier from chicken manure and binnadang compost applied at 6 tons/ha. Use of well decomposed chicken manure appeared to be a potential source of nitrogen for carrot production.

Keywords: Mineralization, Carrots, Binnadang, Vermicompost

FACILITATING HEALTH-RELATED CONTINUING EDUCATION COURSES IN DISTANCE EDUCATION MODE

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Abstract

The biophysical and socio-cultural environment affects the quality of people's life including the elderly and children with special needs. How friendly and appropriate is the physical and social environment towards these people is a vital issue for their health and wellness but more importantly, for them to function well in a society. UP Open University addresses this issue through its continuing education courses, the Caring for the Older Person and Caring for the Child with Special Needs. The

courses are designed to provide basic knowledge, skills and attitude for the care providers, particularly the family members. There are Course Coordinator, Tutor, and Course Administrator to facilitate the course delivery starting from preparation, admission, and student progress to completion. These courses are delivered through face-to-face study sessions and blended mode (online and face-to-face study sessions). Students are strongly encouraged to attend the face-to-face sessions but in case they cannot, they can still participate through webstreaming or skype. For online sessions students can actively participate in the course site through the discussion boards. Course requirements include activities and assignments to enhance learning on proper care and to come up with caring plan on how to meet the needs of the older person and children with special needs. There has been 8 course offerings for Caring for the Older Person from 2004 to 2008 and another offering for 2010. For Caring for the Child with Special Needs, there have been 11 course offerings from 2003 to 2010.

Keywords: caring, distance education, study sessions, caring plan

FACILITATING THE DELIVERY OF ENTREPRENEURSHIP COURSES THE DISTANCE EDUCATION WAY

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Abstract

Without sustainable livelihood opportunities, people would tend to overexploit our environment leading to degradation and marginalization. The Faculty of Management and Development Studies (FMDS) of the University of the Philippines Open University (UPOU) aims to address this by offering continuing education courses such as Personal Entrepreneurial Development (PED) and New Enterprise Planning (NEP). PED aims to focus on personal development as a future entrepreneur and build success-oriented motivations, attitudes, competencies, behavioral characteristics and other qualities that will serve one when he/she starts and manage his/her own business. NEP, on the other hand, aims to provide knowledge and skills in preparing and analyzing a business plan that will give directions in organizing and initiating a new business operation as well as in making decisions in the future when the business is about to expand or diversify. The courses are delivered online through the UPOU MyPortal http://myportal.upou.edu.ph learning management system powered by MOODLE or Modular Object-Oriented Dynamic Learning Environment, with four face-to-face interactions during the 16-week course duration: Orientation, Midterm Session, Action/Business Plan Presentation, and Integration. Note, however, that attendance to these meetings is optional but highly encouraged through some other means such as chat session via Skype or YM conference. Both online and face-to-face sessions are facilitated by entrepreneurs with business degrees. Since the offering of these courses, around 363 students have graduated and some had been writing us of their success stories.

With the current climate change problems, the environment is now considered the new entrepreneurial arena. In this regard, there is a need to transform environmental concepts into real business opportunities and venture on products and services that address environmental issues and concerns. PED and NEP courses hope to incorporate these in future offerings.

Keywords: entrepreneurship, environment, MyPortal, MOODLE, action/business plan

EXPERIENCES IN TEACHING BIODIVERSITY CONSERVATION IN DISTANCE EDUCATION MODE

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Abstract

Biodiversity Conservation is one of the elective courses offered under the Master of Environment and Natural Resources Management (MENRM) program of the University of the Philippines Open University (UPOU). This is instituted to address the escalating global problems of habitat and biodiversity loss. The course is delivered through the Modular Object-Oriented Dynamic Learning Environment (MOODLE) at the online learning management systems of the UPOU. Everything is almost similar as the residential course except for the online discussion and monitoring of progress. I have the monthly graded assignments we call Faculty Marked Assignments (FMA). FMA questions are focused on real life scenario aimed to enhance wise decision making processes of learners. These include critiquing of concepts and principles, assessing and evaluating methodologies, predicting impact of a project, calamity or policy and formulating and designing action plans. Students are free to discuss and ask questions in the course site or through emails or in case of urgent matters through YM or skype. They have informed me of their sustained network with their online classmates as well, discussing the course topics and assignments and even beyond. Overall, the course objectives are satisfactorily attained.

Keywords: biodiversity conservation, distance education, online discussion, MOODLE, FMAs.

DETERMINING THE EFFECT OF THE CHANGES IN RAINFALL AMOUNT ON THE APPROPRIATE PLANTING SEASON OF *ZEA MAYS* L. IN LOS BAÑOS

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Abstract

This poster presentation aimed to observe changes in rainfall amount in Los Baños, Laguna and its effect on the appropriate planting season of corn (*Zea mays* L.). *Zea mays* L., an annual crop, is the second highest grain crop in terms of production in the Philippines. In this country, most of corn fields heavily depend on rainfall for irrigation. Data on the daily amount of rainfall in Los Baños from 2000-2009 were gathered, as rainfall could be the main supplementary water source. Weighted means were used to generate initial ten sets of data points. Furthermore, another ten sets were generated, this time with the removal of outliers. Polynomial curve fitting generated various polynomial functions up to 16th degree generalizing the behavior of points.

Water requirements during the 150-day harvesting cycle for corn were used as benchmark. Variances with respect to the aforementioned water requirements were used to determine the appropriate 150-day planting season given by the interval with the minimum variance. Data analysis showed that in the both sets of data points, the amount of rainfall increased as the year progresses. In addition, the appropriate planting season as generated by the algorithm, in increasing chronological order, were as follows: day 94~243, 107~256, 233~16, 222~5, 225~8, 120~269, 101~250, 124~273, 113~262, 98~247. In conclusion, the researchers observed changes in the appropriate planting season, with 7 of the 10 data sets having similar planting seasons. Further studies are recommended to discover possible periodic behaviors. Also appropriate planting seasons may be done on specific corn varieties.

Keywords: Zea mays L., planting season, rainfall

A STUDY OF THE LEAF ARCHITECTURAL PATTERNS OF SOME VARIETIES OF *Bougainvillea spectabilis* (FAMILY NYCTAGINACEAE

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Abstract

Twenty five varieties of *B. spectabilis*, collected from Bay, Laguna were studied based on their leaf architectural patterns. Specifically, the study aimed to use the leaf architectural characters in finding out the diversity among the varieties of *B. spectabilis* and to investigate the importance of leaf architectural pattern in the classification of *Bougainvillaea sp.* A dendrogram was made to find out the clustering of similar groups in the 25 varieties of *B. spectabilis*. A total of 15 clusters were identified with nine (9) varieties clustered individually as unique varieties and six (6) varieties clustered as groups having similar characteristics. The formation of 15 clusters indicated that the leaf architectural patterns can be used in distinguishing a variety of *B. spectabilis* from its other varieties. A dichotomous key was also made to serve as a guide in the classification of the many varieties of *B. spectabilis.* It is recommended to increase the number of specimens to be studied for a possible classification of the numerous varieties of *B. spectabilis* into different species.

Keywords: Leaf architecture, dendrogram, cluster

TAXONOMIC STUDIES OF HIGHWAY PLANTS ALONG MANILA EAST ROAD IN RIZAL PROVINCE

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Abstract

An initial attempt on the taxonomy of highway plants in Manila East Road Rizal Province was carried out to find out the existing plants along the 37 kilometers site with designated seven sampling stations. A total of 59 plants samples were collected, identified and classified. These samples belong to 22 different species belonging to 13 families with family *Fabaceae* as the first in rank. However, *Samanea saman* Merr., commonly known as Acacia which belongs to the family *Mimosaceae* found to be the most abundant and present along the seven stations. It is also found out that 95.45% of the sample plants are introduced plants and only 4.55% are indigenous to the Philippines. All sample plants were properly labeled and mounted in the herbarium sheets with corresponding *exsiccata* number and preserved for future references. The economic and ecological importance of the plants was also considered so that the people in the place will have a baseline data about the plants to help them make sound decision on their propagation, conservation and preservation activities. The study also aims to take part in the government initiative of having plant inventory of the Philippines and serve this study as basis in crafting regulatory policies in the protection and conservation of biodiversity.

Keywords: taxonomic, highway plants, Rizal

ACROCARPOUS MOSSES OF MT. DATA, BAUKO, MOUNTAIN PROVINCE

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Abstract

This study is a preliminary survey of the diversity of acrocarpous mosses of Mt. Data, Bauko, Mountain Province. It aimed to identify the species of acrocarpous mosses in the area through taxonomic characterization and classification. Characterization was done by evaluating the macroscopic and microscopic features of the gametophytes and sporophytes of the collected mosses. Classification by family, genus and species were done in reference to the key of Bartram (1939). Eight species of acrocarpous mosses were identified in the site, three of which were previously been collected by Ramos and Merrill (Bartram, 1939). The result of this study will serve as contribution to the data of the diversity of Philippine mosses.

Keywords: *acrocarpous, gametophyte, sporophyte*

CLEAN TECHNOLOGY OF *Cocos nucifera* MEAT

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Abstract

Clean technology applies to the complete utilization of a particular material like coconut *Cocos nucifera* meat. *Cocos nucifera* meat is a source of virgin coconut oil using cold process, as food supplement, personal care products emulsifier and biodiesel, an alternative fuel. The water component extracted during virgin coconut oil extraction process were utilized into vinegar and "sapal" was processed into dessicated coconut, which is used as one of the ingredients for culinary products particularly cookies and pastries. The coconut meat weighing five kilograms of coconut meat yielded 15% virgin coconut oil as food supplement, the first extract; 15% virgin coconut oil intended for personal care products, second extract, which is utilized as one of the reagents in commercialized liquid hand wash, transparent shampoo and VCO cream; and 1% virgin coconut oil as third extract which is for an alternative fuel, biodiesel which is colorless, moderate biodiesel odor and free from lead content as per laboratory analyses. The virgin coconut oil by by-products such as water and "sapal" are utilized into vinegar with 50% rate of production and crumbs for "calamares" and chicken lollipop containing 50% dessicated coconut added to all purpose flour.

Keywords: clean technology, coconut, virgin oil, hand wash, vinegar, crumbs

IDENTIFICATION OF PARASITES IN TILAPIA FROM LAGUNA LAKE

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Abstract

Tilapia fish pens are a common sight in almost all the major rivers and lakes in the country, including Laguna Lake. Studies on parasites of Philippine fishes were conducted, however, the knowledge on the tilapia parasites, from Laguna Lake is still scarce. The present study aims to identify the parasites found in tilapia (*Tilapia nilotica*) from Laguna Lake. Sixteen fish samples of *Tilapia nilotica* were examined for the presence of ectoparasites and endoparasites. Macroscopical examination was done using hand lens. Microscopical examination was done by scraping the gills and intestines. Five out of sixteen fishes were infected with *Dactylogyrus*, two with *Trichodina*, two with *Transversotrema*, one with *Argulus* and two with *Alitropus*. These parasites were isolated from skin/scales, gills and intestine of the infected fishes. The prevalence was highest in *Dactylogyrus* (31.25%) followed by *Trichodina*, *Transversotrema* and *Alitropus* (12.5%) and lowest in *Argulus* (6.25%). Taken together, these results suggest that further studies must be conducted on the fish tested and its parasites. Studies on its/their environment may also be conducted if they play a role in the life span of the two tilapia species after their capture.

Keywords: prevalence, monogeans, digeneans

TAXONOMY AND ETHNOPHARMACOLOGY OF INDIGENOUS MEDICINAL PLANTS IN TIGBAUAN, ILOILO

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Abstract

Medicinal plants had important contributions in the healthcare system of local communities as the main source of medicine for the majority of the rural populations. This study aimed to (1) categorize the diversity of indigenous medicinal plants in Tigbauan, Iloilo based on their taxonomic rank; (2) document the traditional uses, preparations and applications of medicinal plants (ethnopharmacology) by the local community; (3) determine the distribution, morphological forms, habitat and values of indigenous medicinal plant resources in Tigbauan, Iloilo; and lastly identify and enumerate the medicinal uses of each identified indigenous plants. Ethnopharmacological and taxonomic data of indigenous medicinal plants were collected in the study site through semi-structured interview and snowball sampling methods among knowledgeable elders, gardeners, healers, and traders. Voucher specimens were collected and herbarium specimen preparations were done. The taxonomic classification of the indigenous medicinal plants in Tigbauan, Iloilo was based on Cronquist's System of classification. A total of 101 species, grouped within 92 genera, 44 families and 27 orders. The medicinal plants were described according to preparation techniques, mode of application, administration route, growth forms, habitat distribution, abundance and medicinal uses. Dermatological diseases were the most commonly treated ailment while opthalmological, oral and kidney-related problems were least treated by those plants. Trees were the commonly used source and the leaves were the most widely used plant part to treat a given disease. Results showed that there was a diversity of medicinal plants, traditional and ethnopharmacological knowledge about the uses, preparations and applications present and maintained among the Tigbauenos. Furthermore, this study allowed in the identification of many high value and high priority medicinal plant species, indicating high potential for economic development through sustainable collection and trade.

Keywords: Taxonomy, ethnopharmacology, indigenous plants, Tigbauan

STUDENT SUPPORT PRACTICES IN DISTANCE EDUCATION

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Abstract

Since learning environmental concepts in distance education (DE) mode is not an easy task, student support is necessary. Student support inadequacy is one of the critical factors that contributed to the attrition rate being experienced by most of the universities, considering the increasing number of emerging diverse cohort students. It plays a pivotal role in learning environmental theories via DE. Hence, it is critical for the student support team to design methods/practices skills that can help deliver the course as sensitive and as adaptive as possible and to provide overall educational help to the student. The Faculty of Management and Development Studies (FMDS) of the UP Open University (UPOU) empathized with this shortfall, and aimed to address this through its various offerings/programs. Various supports are provided to the students once they are admitted to the program. These include enrollment services (information on registration and enrollment); dispatch services (course and other reading materials); tutorial assistance services (academic support) and counseling services (administrative support). These services are delivered either through post mail, electronic mail, telephone, teleconferencing, video or computer conferencing. As an additional feature, the UPOU has eleven (11) Learning Centers (LCs) which are hosted by government or private institution, and managed by a Learning Center Coordinator (LCC). UPOU also have Testing Centers (TCs) locally and abroad. The LC is a place where learners come to avail of UPOU services, both administrative and academic needs, while the TC serves as venue for examinations. For those students based abroad (offshore students), the Office of the Vice Chancellor for Academic Affairs (OVCAA) created a body that oversees and caters to the overall needs of these students.

Keywords: student support services, distance education, LC's / TC's, services delivery, offshore students

DE AND ONLINE LEARNING: A BORDERLESS MODE FOR ENVIRONMENTAL EDUCATION

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Abstract

DE stands for distance education, which is currently being popularized by the advances in information and communication technology. Online learning is a form of DE where learners and teachers conduct their learning transactions through the internet. Both forms of modes for learning can be tapped to educate people on environmental concepts. They go beyond geographic borders, generational differences, and even personal disabilities. However, since they are borderless, and people involved in the learning transactions are at a distance, there is a need to develop support system for student, faculty,

technological competency, and the like. The distance between the players of learning necessitates the establishment of these forms of support.

Keywords: distance education, environmental education, online learning

FACULTY SUPPORT PRACTICES IN THE DISTANCE EDUCATION MODE

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Abstract

Facilitating the delivery of degree programs and courses in the distance education mode requires the provision of support services to the Program Chair, Faculty In-Charge and Tutors to ensure that the student undertake his independent learning experience. Faculty support service is a system of administrative and operating procedures that are designed to assist faculty members make the transition from the conventional to distance education mode of learning.

Faculty support practices in distance education starts from facilitating the preparation of course offerings by the Program Chair, identification and selection of Faculty In-Charge (FICs) who will teach the courses, review and evaluation of course pack by the assigned FICs, training of appointed FICs in the UPOU's learning management system (MyPortal), assistance in the delivery of courses by the FICs, administration of final exams in the respective learning/testing centers both here and abroad, and submission of grades by the FICs.

Experience shows that faculty support practices in the distance education mode should be proactive and not reactive. It should also ensure proper identification of faculty concerns for appropriate referral system. Staff in-charge of faculty support should be a good coordinator and communicator. He or She should also be literate in communication technology considering that the support provided is highly individualized and technology mediated.

Key words: faculty support, distance education, technology mediated