

POSTER SESSIONS

Biological Sciences

SOME EDIBLE FERNS IN BUKIDNON

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Eight species edible ferns are found in Bukidnon, viz., *Ceratopteris thalictroides* (Linn.) Brongn., *Diplazium esculentum* (Retz.) Sw., *Blechnum capense* L., *B. orientale* L., *B. vulcanicum* L., *Stenochlaena melnie* Underw., *Pteridium aquilinum* (L.) Kuhn, and *Marsilea crenata* Presl. The scientific name, available common names, family, ecology and economic uses of these edible ferns are presented in the paper.

ANTIMUTAGENIC POTENTIAL OF BRYOPHYTES FROM ILOILO

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Eight (8) species of bryophytes from Iloilo Province consisting of seven (7) mosses and one liverwort were identified and tested for mutagenic and antimutagenic potentials using Schmid micronucleus test on Swiss white mice.

The species were: *Hyophila involuta* (Hook.) Jaeg., *Thuidium investe* (Mitt.) Jaeg., *Vesicularia reticulata* (Doz. et Molk.) Broth., *Vesicularia montagnei* (Bel.) Fleish., *Fissidens sylvaticus* Griff., *Philonotis* (Doz. et Molk.) Mitt., *Ectropothecium dealbatum* (Hornsch. of Reinw.) jaeg. and *Ricardia* sp. (liverwort).

Two (2) species of mosses, name *Hyophila involuta* and *Thuidium investe* showed positive results in reducing the number of micronucleated polychromatic erythrocytes in Flayl-induced and Mitomycin C-induced abnormalities in mice (Swiss strain). Other moss species showed slight changes or very variable results using t-tests at .05 level of significance with the control groups.

Crude aqueous and ethanolic extracts of all bryophyte species are non-mutagenic or non-toxic at concentrations up to 50 mg/K body weight.

BIO-PHYSICO-CHEMICAL AND SOCIOECONOMIC ASSESSMENT OF SARNAP LAKE IN RELATION TO ITS FISHERY PRODUCTIVITY

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The main concern of the study was to assess the bio-physico-chemical and socioeconomic factors affecting the productivity of Sarnap Lake as bases for the formulation of policies for optimum lake utilization.

Baseline data on selected bio-physico-chemical characteristics of the lake were gathered and analyzed from November 1987 to April 1988. Trends observed were compared with those of other lakes in the country, particularly those found in Luzon. Apparent similarities were noted.

Socioeconomic data on the fishing households in the study area, along with the levels of fish production for open fishing in the lake, were also established. Aggregate fish production during the study period was 6,287.6 kg, with gill net giving the biggest share (31.3%) and fish traps (17.5%).

The productivity of selected fishing gears was determined, as well as the bio-physico-chemical changes and the socioeconomic factors, which affect productivity. Simple cost and returns analyses of the different fishing gears revealed that they are economically profitable, except "as-asad."

Recommendations on how to develop and manage the lake's resources were formulated based on the findings.

QUANTITATIVE AND QUALITATIVE CHANGES IN THE SKELETAL MUSCLE ACETYLCHOLINESTERASE ACTIVITY OF *Oreochromis niloticus* EXPOSED TO METHYL PARATHION

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Juvenile *Oreochromis niloticus* exposed to 0.10 mg/L of methyl parathion for 48 and 96 hours were used to study the effects of the pesticide on acetylcholinesterase, an important enzyme in the cholinergic divisions of the nervous and neuromuscular systems. Spectrophotometric assay and histochemical test were performed on the epaxial skeletal muscle. Quantitative results showed enzyme inhibition of 43.02% and 56.62% after the 48 and 96-hour exposures, respectively. Histochemical analysis revealed decreased sites of acetylcholinesterase activity in the muscle fibers which can be directly related to enzyme inhibition. The study proved that methyl parathion could effectively affect organisms through their interference with the acetylcholinesterase enzyme system and that this could be the toxic mechanisms to various important species in the aquatic environment.

CHANGES IN THE PERIPHERAL BLOOD AND HEMOPOIETIC TISSUES IN THE TRUNK KIDNEY OF NILE TILAPIA (*Oreochromis niloticus*) AFTER ACUTE EXPOSURE TO ZINC

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Adult *Oreochromis niloticus* were exposed to 96 hr-LD50 zinc concentration for 3, 6, 12, 24, 48, 72, and 96 hr exposure periods. Blood and tail kidney were analyzed for hematological and histological changes. Zinc exposure resulted in significant increases in red blood cell counts, hemoglobin, hematocrit, mean corpuscular volume, and mean corpuscular hemoglobin values; a decrease in mean corpuscular hemoglobin concentration; and a significant increase in leucocrit. Reduced number of blood cells in the kidney interstitium of zinc-treated fish was observed in all exposure periods except in 72-hr section where blood cells markedly increased.

THE SESQUITERPENE LACTONES OF *MIKANIA CORDATA* (BURM. F.) B.L. ROBINSON

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The study of the sesquiterpene lactones of *Mikania cordata* (Burm.f.) B.L. Robinson is part of the phytochemical investigation conducted on the plant in order to compare the constituents of the Philippine species with those reported in other countries (1-4) and to obtain extracts and isolates for the study of the biological properties of the plant (5-7). Commonly known as "bikas" or "baging-ilog", *M. cordata* is a climbing hemp weed which has been used for coughs, sore eyes, snake and scorpion bites and for wounds.

The sesquiterpene lactones were isolated from the chloroform extract by a combination of chromatographic techniques such as normal phase chromatography, reversed phase chromatography and molecular sieving. The structures were elucidated by the combined spectral techniques of ultraviolet spectroscopy, mass spectrometry and ¹H and ¹³C nuclear magnetic resonance spectroscopy. The NMR techniques included correlation spectroscopy (COSY) and distortionless enhancement by polarization transfer (DEPT). Wherever necessary, derivatives were prepared to resolve structural difficulties.

Elucidation of the sesquiterpene lactones showed that they have germacranolide skeleton, that they can be grouped into three classes and that most have exomethylene linkage. The structural differences shall be discussed.

Social Sciences**ENHANCING VALIDITY THROUGH CONSISTENCY BETWEEN INSTRUCTION AND EVALUATION PROCEDURES**

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The paper underscores the importance of consistency between teaching methods and learning outcomes sought on one hand and evaluation procedures employed on the other hand in order to obtain valid results of educational experimentation. Unstructured, open-ended informal individual interaction were held by the researcher with randomly selected pupils from the experimental group who received instruction in cognition-and value-based inquiry method modified by the present investigator, and from the control group with whom the inductive method was employed

Results of the informal exchanges, more effectively than highly structured, objective-type written tests revealed differences in achievement between the two groups in Kohlberg's cognitive-moral stages of development adapted for the study.

THE IRRELEVANCE OF LAW TO THE JUSTICE NEEDS OF SOCIETY

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As early as the third century B.C., Aristotle (322-348 B.C.) thought and taught that there is no justice where there is no law, and that law is the ruler of all rulers. Following the logic of such propositions, there is no justice where law is irrelevant. For the irrelevance of law is tantamount to the absence of law. Moreover, when some men are above the law, then, law is no longer the ruler of all rulers but merely a tool of men to oppress other men.

The introduction of Western law in the Philippines under Spanish and American colonialism rendered Western law irrelevant if not oppressive to most Filipinos. Colonialism imposed a master-slave relation between the foreign rulers (including their native allies) and the native Filipino subjects. Thus, injustice was the rule than the exception. This state of affairs continued even after decolonization in 1946 because the distortion of Western law under colonial rule was not corrected, or even if corrected was not sufficient. Moreover, even if fully corrected, the Filipino leaders and administrators, who took over the reins of government, inherited the colonial ways, thoughts, values, habits, and vices of their predecessors. Colonial socio-economic-political structures, therefore, remained intact. And the Filipino is still far from attaining justice as conceptualized by Plato and Aristotle.

Among the contemporary Itneg (Tinggian) of Abra province, the imposition of a distorted form of Westernized state law, existing side by side with their native customary law, has caused confusion, ambivalence, and conflicts. This situation is aggravated by the breakdown of traditional social organization where individualism, commercialism, profit-seeking, and impersonalism have crept in. Additionally, population pressure on existing resources, like land, forests, and rivers, has driven many to exclusively claim or own them or monopolize their use. Consequently, more disputes and conflicts occur among the lowland Itneg than among their upland cousins.

Some example of conflict between state law and customary law is the non-recognition by the state of marriages solemnized under customary law, creating problems of illegitimacy and succession. Moreover, under state law, heavily influenced by Roman Catholicism, divorce is not allowed. Under customary law, divorce is allowed. Because of the hypocritical attitude on the part of the state and Roman Catholicism of ignoring the biological, social, and cultural necessity of divorce, many divorcees simply remarry, either under customary law or without the benefit of a formal ceremony. This situation also leads to problem of succession and possible prosecution for bigamy, concubinage, or adultery under the state law.

The non-recognition of ancestral lands by the state also has exacerbated disputes over ownership, use, or exploitation of land and forest resources. Their administration under the Bureau of Lands or the Bureau of Forest Development only led to a situation where native upland Itneg are regarded as "squatters" in the land of their ancestors, on the onehand, and where influential lowland people use them as pasturelands or exploit them for logs, on the other. Ironically, the Itneg, themselves, fight each other over the leftovers of such lowland influential people, or work out alliances with them to monopolize benefits from such resources to the prejudice of their fellow Itneg or even their relatives.

These facts inescapably lead to the realization that native customary law and the rights of the so-called "cultural minorities" must be recognized and upheld, and that Westernized state law must be purged of the cobwebs of colonialism and be readjusted to the requirements of contemporary Philippine development. This can be done through creative legislation and imaginative education of the public on the true meaning and spirit of the law, justice, and liberal democracy.

Agricultural Sciences

SURVEY OF NODULATION OF PHILIPPINE TREE LEGUMES

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A survey on the nodulation of tree legumes was conducted in Luzon, Mindanao and Palawan from October 1990 to October 1991. The survey covered 16 taxa of CAESALPINIACEAE, 24 MIMOSACEAE and 11 PAPILIONACEAE. Total tree taxa examined was 51. Out of this total, the nodulated taxa consists of 18 MIMOSACEAE and 10 PAPILIONACEAE. Out of the 28 nodulated taxa, 21 have been previously reported as nodulated and the remaining seven, namely, [*Albizia cf. lebbeck*, *A. magallanensis*, *Archidendron clypearia* f. *clypearia*, *A. clypearia* f. *praimana*, *A. ellipticum*, *Dalbergia mimosella*, and *Ormosia calayensis*] which are all wild indigenous tree legumes, are to be reported nodulated for the first time. A brief discussion on the prospect of integrating some of the taxa in agroforestry and reforestation is also provided.

QUICK TESTS FOR OPTIMIZATION OF VEGETABLE NITROGEN NUTRITION

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The increasing costs of nitrogen (N) fertilizers and the danger of creating environmental pollution due to excessive N fertilization practices create a need for more efficient N fertilization of vegetable crops. This study was conducted with the main objective of assessing the N fertilizer requirements of cabbages on a coarse loamy mixed mesic Dystric Eutrochep soil and consequently developing a model which would assist in predicting N fertilizer requirements over a wide area.

Glasshouse and field experiment were conducted to assess the utility of soil and plant (sap) tests for assisting in determining the N fertilizer requirements of cabbage. The concentration of $\text{NO}_3\text{-N}$ and $\text{NH}_4\text{-N}$ in either the xylem or petiole sap of cabbage were found to be influenced by several factors such as leaf position, time of day, sample storage time, plant age and form of fertilizer N.

A large field trial indicated that at 4 sampling dates (50, 60, 80 and 90 days after transplanting, DAT) and prior to sidedressing, xylem ($R^2 = .73^{**}$) and petiole ($R^2 = .86^{**}$) sap were strongly correlated to extractable $\text{NO}_3\text{-N}$ and $\text{NH}_4\text{-N}$ in the soil to a depth of 30 cm. Nitrate-N levels in xylem sap at 60 and 80 DAT and petiole sap at 50, 60 and 80 DAT were good predictors of harvestable fresh head yield. Maximum marketable fresh head yield (55 t/ha) was achieved with an initial N application of 300 kg N/ha over a growing period of 150 days in which 448 mm drainage was estimated. At heading, on the 300 kg N/ha, soil mineral N levels were 75 kg N/ha, xylem sap concentration was 333 ppm $\text{NO}_3\text{-N}$ and 1651 ppm $\text{NH}_4\text{-N}$ in the petiole sap. This critical value for petiole sap is higher than that reported in the literature for cabbages. At petiole sap levels below the critical value, sidedressing with 100 kg N/ha as urea was required to achieve a similar yield as found with an initial application of 300 kg N/ha as calcium ammonium nitrate.

Using the data obtained from the field trial, a simple model termed "sidedressing model" was developed. The model specifically determines the amount of N fertilizer needed to be applied as a sidedressing at a critical time (heading) to obtain maximum yield. The model was validated, using the data from another N fertilizer trial conducted in the following year. The model successfully predicted whether N sidedressing is required or not but only a limited validation could be made of the prediction rates.

The limitation of the sidedressing model of being site and season specific can be reduced by using simple submodels to predict the measured component which assessed N in cabbages at heading (Nh). One submodel used (the heat unit model) was modified by including data from 2-year trial results, to predict Nh and also provided a prediction of N uptake at maturity (Ny). Although not able to be validated in this study, the model shows potential for use by environmental administrators in predicting the likely effects of various growers' practices in relation to identifying problems associated with $\text{NO}_3\text{-N}$ in drinking water and in edible cabbage heads.

FERTILITY CLASSES OF SOILS AND QUALITY OF IRRIGATION WATER IN TOBACCO-GROWING AREAS IN THE PHILIPPINES

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An extensive survey and characterization of soils and irrigation water, undertaken by the Soil and Water Management Division of the National Tobacco Administration (NTA) from 1987 to 1990, were aimed to (1) determine the physico-chemical characteristics of soils and the quality of irrigation water in different tobacco-growing areas in the Philippines and, (2) provide systematic bases for delineating areas that could be suitably grown to tobacco and those that could be considered marginal so that commercially profitable alternative crops may be introduced.

The Soil Fertility Classification Scheme (SFCS), written in BASIC computer language and recently established at NTA, was used in the delineation of suitable and marginal areas. The same scheme was used in the classification of the different areas as to their fertility and chloride (Cl) status. In classifying the fertility of the 221 areas evaluated, none was identified Class I (areas with high nutrient level); 86% were Class II (areas with moderate nutrient level); and 14% were Class III (areas of poor fertility). Using the classification scheme, there is a fertilizer recommendation for each soil class in order to obtain good yield and quality tobacco.

As to Cl level, 24% were Class II (areas with soil Cl still at tolerable/manageable level) and 14% were Class III (areas which are no longer suitable for tobacco and therefore should be planted to other crops).

The quality of irrigation water assessed in terms of salinity and Cl content showed that of the 474 sites evaluated, about 2% were classified with high levels. Chloride values exceeding the critical level of 142 ppm Cl were recorded in 7 sites in Ilocos Norte [Batac (2) and Pinili (3)] and Ilocos Sur [Narvacan (1) and Sta. Maria (1)]. In the same sites, including San Esteban (Ilocos Sur), salinity at $EC > 2.25$ mmhos/cm were likewise measured. Results indicate that the groundwater in these areas is no longer suitable for irrigating tobacco.

CLONAL PROPAGATION OF F1 HYBRIDS OF MUNGBEAN (*Vigna radiata* L. WILCZEK) X BLACKGRAM (*V. mungo* L. HEPPEL) by TISSUE CULTURE

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An *in vitro* clonal propagation system for F1 interspecific hybrids of mungbean (*Vigna radiata* L. Wilczek) X blackgram (*V. mungo* L. Hepper) is developed. Multiple shoots and buds were induced from the cotyledonary nodes of F1 hybrid seedlings when cultured onto MS salts (half-strength macroelements) and vitamins (Murashige and Skoog, 1962) with 1.0 mg/L 6-benzylaminopurine (6-BAP). Additional shoots were produced from subsequent culturing of buds and nodal cuttings *in vitro*. Elongating shoots were cut and transferred onto MS medium with or without 0.1 mg/L gibberellic acid (GA_3) for root initiation and plantlet establishment. Rooted plantlets were successfully established in the greenhouse and F2 seeds were produced.

The propagation system required 18 weeks to complete and may be adapted to propagate other hybrids among the *Vignas*.

GENMOD: A GENERALIZED INSECT POPULATION MODEL.

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GENMOD, a generalized model using Leslie projection matrix is composed of four independent modules which can project the population of insect pests of cereals, vegetables, and field crops. Aphids and thrips are grouped in a separate module. A simple pest management game is included to demonstrate the effect of biological control and insecticide sprays on pest population dynamics. Populations are projected

at discrete time intervals. The model can project the population of any species with known biology (age-specific reproductive and survival rates). Population trends range from exponential to cyclic curves. The model is most useful as a teaching tool in the study of pest population dynamics.

The modules were programmed using Turbo Basic version 1.1 and can be run separately on a modest IBM PC compatible without a hard disk or a laptop computer with only one disk drive.

SWEET POTATO CUTTING LENGTH APPROPRIATE FOR VOLCANIC ASH-COVERED SOIL

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A pot experiment was conducted to simulate conditions of planting sweet potato in volcanic ash-covered soil. Sweet potato was planted in bottomless clay pots filled with 30 cm deep volcanic ash. Factors studied were cutting length (25 and 50 cm) and fertilization (14-14-14, rice straw compost and control). Planting depth was 15 cm for the short cutting and 30 cm for the long one. Harvesting was done at 50 days after planting. An interaction effect of the two factor on root yield was observed. Higher yields were obtained with fertilization for the short cutting while without fertilization higher yield was obtained with long cutting or those touching the soil. Heavier vines were obtained for long cuttings regardless of fertilizer application. Complete fertilizer was better than compost both for increasing vine and root weights. Roots for short cuttings develop at shallower depths. Implications of the findings are discussed.

BIOLOGICAL CONTROL OF *Rhizoctonia solani* KUHN BY SOIL FUNGAL ANTAGONIST ANF-777

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Out of 7,516 microbials examined in crowded-plate cultures, 189 prospective antagonist were isolated and cultured. One of the antagonists selected that indicated exceptionally strong inhibitory effect against *Rhizoctonia solani* Kuhn was a fungus, ANF-777. Presumptive tests on the active substance produced by ANF-777 showed clear zones of inhibition against the assay plate organism *Aspergillus niger*.

The antibiotic in the brew was readily extracted by benzene, butanol, ethyl acetate, and diethyl ether. Thin layer chromatography of the antibiotic gave an R_f value of 0.94 and a distinct inhibition zone of 26 mm diameter against *A. niger*.

The mechanism of antagonism between the soil microbial antagonist and *R. solani* seem traceable to the production of antibiotic by the fungal antagonist ANF-777.

NODULATION AMONG THE LEGUMINOSAE IN THE PHILIPPINES

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A total of 133 species in 68 genera and 19 tribes were covered in the study representing 28%, 38% and 36% for Caesalpiniaceae, Mimosaceae and Papilionaceae respectively.

No nodulation was observed in any of the 25 species for Caesalpiniaceae. Roots are characterized by dark to reddish brown and the texture is wiry.

For Mimosaceae two woody indigenous species did not exhibit nodulation while four (4) are in the range of 50% to 85%. All the introduced species for reforestation exhibited 100% nodulation. The Caesalpinoid (formerly Astragaloid) type of nodule was observed. This type is typically branched, elongated or lobed 2 x 5 to 5 x 12 mm, when underdeveloped, may be prolate or ovoid 2-3 mm dia., color may range from light to dark brown, surface may be rough and warty.

For the Papilionaceae all the 85 species were nodulated, 44 of them mostly herbs exhibited 100% nodulation. There were four (4) nodule types observed: Aeschynomenoid, Crotalarioid, Desmodioid and Mucunoid.

Desmodioid type predominates and is characterized by most species of large tribes as Tephrosieae (6 spp.), Indigoferae (3 spp.), Desmodieae (17 spp.), Phaseoleae (29 spp.), Crotalarioid type by *Crotalaria* species, Aeschynomenoid type by species of *Aeschynomene*, *Arachis*, *Stylosanthes* and *Zonit*a. Mucunoid type was exhibited by *Gliricidia* and 7 species of *Sesbania*.

Although nodule type is a distinct feature at the tribal level, overlaps exist, as such in the prevalence of dimorphic group. The Caesalpinoid nodule type characteristic feature of Mimosaceae which are woody, is also exhibited by woody species of Papilionaceae.

Health Sciences

LOCALLY MADE VENTRICULOPERITONEAL SHUNT SYSTEM

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The high prices of ventriculoperitoneal shunt materials, oftentimes have led neurosurgeons to improvise and use locally available materials for the shunting needs of their patients. Several shunting devices were designed locally, but they have to be constructed and tested intraoperatively thus prolonging the operative time. These problems led the authors to devise, and test a different shunt design to improve the drawbacks of the previous local shunts.

The current design utilizes two slit valves in tandem fashioned out of silastic materials enclosed in a bigger silastic tube which serves as the pumping chamber. The connectors used are stainless steel tubes. Three types of shunts were designed based on the closing pressures: low, medium and high, depending on the length of the slit in each valve. The shunts were prepared, tested and sterilized by autoclaving before the operation.

The shunts were tested for closing pressure, opening pressure and flow rate/pressure relationships. These were compared to the reported fluid dynamics of the available commercial shunt systems, and were found to be at par.

Twelve locally made shunts were implanted to twelve patients with hydrocephalus with the following etiologies: tumors in the six, tuberculous meningitis in four, nasethmoidal meningocoele with porenchepalic cyst in one, and suppurative meningitis in one. Three developed complications: shunt infection in two and shunt block in one giving a complication rate of 25%. Three patients in this series died. The first succumbed to sepsis due to shunt infection (ventriculitis); the second patient died of brainstem infarction due to arteritis following tuberculous meningitis and the other died of severe bronchopneumonia. All the other patients improved and tolerated the shunts on follow-up ranging from two weeks to nine months.

The cost of the local shunt is calculated at P130.00. Compared to the current price of commercial shunt systems which is P6,500, the authors have achieved their goal in providing a working shunt for indigent patients.

A follow-up study comparing the local shunt and the commercial shunts in congenital hydrocephalus is planned.

