POSTER PAPERS

Development of Palay Purity Tester

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ABSTRACT

The Palay Purity Tester was fabricated, modified and developed to come up with a reliable equipment capable of measuring the purity of palay sample under the NFA's procurement standard classification. The fabricated model was tested and evaluated using palay samples with predetermined purity of A (97.0% and 95.0%), B (94.0%, 92.0% and 90.0%) and C (89.0% and 87.0%). All samples carried a moisture level of 14%. Test and evaluation were conducted to determine the tester's efficiency at three different blower openings (1/2, 2/3 and 3/4 open), its reliability and adaptability at NFA palay procurement operations.

Results showed that there was a numerical discrepancy between the actual purity of the sample and the meter reading. However, taking into consideration the purity level (A, B and C used in palay procurement operations) of palay samples used, the tester's reading complied with the required purity level of the sample being tested indicating applicability to NFA procurement operation.

Statistical analysis showed that the 2/3 blower opening gave the best reading with the least standard error of 1.779. This result therefore shall be used as the working data for the calibration of the tester's autoweigher to project the true reading.

A Proposed Model for the Waste Utilization Value

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ABSTRACT

The Waste Utilization Value (WUV), a concept introduced by one of the authors (Jose), is the value of a waste in monetary units per unit measure. The value is positive if the waste is profitably utilized or negative if the waste is hazardous or a pollutant. A model for wastes having positive WUVs is being proposed. Sixteen of the 30 wastes surveyed for the buying price in Metro Manila were considered. "Discriminant Analysis" was used. The following factors that affected the WUV were chosen -- availability, separation, handling, product, demand, cost, technology and profit factors. The model correctly classified 15 of the 16 types of wastes into predicted group membership.

On the Dynamics of Resource-Consumer-Toxicant-Systems: Models of Reproductive Effort and Resulting Offspring of an Individual Organism

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ABSTRACT

Dynamic models for an individual organism's reproductive effort and resulting offspring were developed and analyzed. These models were based on life history theory and bioenergetics of an organism. Two indices, namely, the organism's ***energy utilization index*** *and* ***reproductive index,*** *were defined and discussed; the former was used as indicator of stress resulting from energy investment in reproduction, the latter as indicator of reproductive success or failure. The organism's threshold reproductive effort (level of reproductive effort that optimizes the energy utilization index) was likewise defined. The dependence of reproduction on available food was also determined. To illustrate the ideas in this study specific forms of the general model were developed for* ***Daphnia*** *and the metals arsenic and cadmium.*

[1] This research was supported by the Mindanao State University Research Center under URC Project Number 295-89.

Morpho-Histochemical Studies of Some Medicinal Ferns

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ABSTRACT

*Five species of medicinal ferns found in Bukidnon, viz., **Blechnum orientale** Linn., **Pteridium aquilinum** (L.) Kuhn., **Sphenomeris chinensis (L)** Maxon, **S. chinensis** (L.) **Maxon var. rubens** Amoroso et Medecilo com. nov., **Oleandra maquilinguensis Copel.** are described morpho-anatomically and their medicinal values are discussed. Likewise, the active constituents and their distribution within the plant tissues and organs were determined through histochemical tests. Active principles such as alkaloids, amygdalin, tannin, saponin, formic acid, tartaric acid and oxalic acid were observed to be present from detectable to very abundant.*

Localization of Zinc in the Gonadal Tissues of *Tilapia Nilotica* Linn.

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ABSTRACT

Subcellular localization of zinc in gonadal tissues was done in the microsomal fraction of adult fish exposed to 17 ppm zinc for 14 days. The elution pattern of the cytosolic fraction of treated ovary and the testis indicates zinc bioaccumulation. Elution peak two corresponds to cytochrome C, characteristics of metallothionein binding with zinc.

Gonads of zinc exposed fish show altered morphological structures. The oocytes were vacuolated and devoid of yolk and the thecal cells were disintegrated. There was dramatic reduction in oocyte number. The testis of juvenile fish remained immature and showed only spermatogonia and proliferation of the connective tissues.

Competition of Water Hyacinth [*Eichlornia Crassipes* (Mart.) Solms] with *Hydrilla Verticillata Royle* and *Pistia Stratiotes* Linn.

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ABSTRACT

Hydrilla verticillata *can control the growth of* ***Eichlornia crassipes*** *to some extent when nutrients are limited. Although a floating weed,* ***E. crassipes*** *needs to anchor its roots to absorb nutrients from the bottom. Failure to do so affects its growth rate.*

Pistia stratiotes *can grow better than* ***E. crassipes*** *if both plants are placed in a container with limited amount of nutrient and space. It does not, however, completely suppress the growth of* ***E. crassipes.***

Strain Improvement of Selected Species of Edible Fungi

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ABSTRACT

An efficient method for mutagenesis using UV irradiation and nitrous acid treatment was developed for ***Volvariella volvacea Agaricus bisporus*** and ***Lentinus edodes****. The Holliday technique for mutant identification and the characterization of auxotrophic mutants was used. Vegetative mycelia of high temperature tolerant strain of* ***A. bisporus*** *and* ***L. edodes*** *were isolated and used in breeding trials.*

Methods for the isolation of protoplast from ***V. volvacea*** *using commercial enzyme preparation were described. The regeneration and reversion frequency of protoplasts for this fungus was evaluated. A system for genetic analysis was also done using available mutant strains.*

The production of fruit bodies using different substrates for the three species was investigated. Environmental factors affecting fruit body production were determined and analyzed.

Chromium From Leather Tanning Effluent

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ABSTRACT

The possibility of using lime liquor in a waste complementation process for recovery of chromium from leather tanning effluent was explored. High recovery rates of 98.2%, 96.5% and 96.6% for the bluish green compound, green pigment and basic chromium sulfate, respectively, were obtained in this study. The process involved is efficient, relatively simple and cheap.

Organogenesis from Leaf Callus of Mungbean (*Vigna Radiata* L Wilczek) and Mothbean (*Vigna Aconitifolia* Jacq Marechal)

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ABSTRACT

*Callus cultures of mungbean (**Vigna radiata** L. Wilczek) cvs. Pag-asa 2 and Pag-asa 3 were established from leaf explants cultured on modified Murashige and Skoog's (MS) medium (1962) supplemented with 2.0 mg/l 2,4 dichlorophenoxy acetic acid (2,4-D) and 0.5 mg/l benzylaminopurine (BAP). Regeneration of roots was observed upon transfer of the compact green calli to MS medium with different hormonal combinations.*

*In mothbean (**Vigna aconitifolia** Jacq Marechal) acc. 1892 calli were established from leaf explants cultured on B5 basal medium (Gamborg et al. 1968) supplemented with 1.0 mg/l 2,4-D and 0.4 mg/l kinetin. Regeneration of shoots was observed upon transfer of calli to L6 medium (Kumar et al. 1988) with 1.0 mg/l zeatin or a combination of 0.5 mg/l each of zeatin and BAP.*

Endosperm Culture of Calamansi (*X Citro Fortunella Mitis*), a Progress Report

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That seedless calamansi could be derived directly by regeneration of plants from the triploid endosperm was first theorized by RC Barba and LF Pateña in 1976. Plantlets were then regenerated from callus culture of calamansi seed tissues (Pateña, Barba and Estrella 1978). The seed tissues used did not contain the endosperm, hence, subsequent studies traced the development of the endosperm as the seed matured. Results of initial work showed that the endosperm developed about two weeks after pollination, first nuclear and at later stages, cellular (Pateña 1980). Between 1-2 months after pollination, greater development of the endosperm occurred. This period was identified to be a good stage of collecting seeds for the ***in vitro*** *culture of endosperm to obtain triploid plants for seedlessness (Pateña 1980). In 1987, the endosperm was excised and cytologically identified (Avenido and Barba 1987). From 1983 to 1989, calli were established from the nucelli-endosperm (NE) tissues and plantlets were regenerated (Avenido, Zamora, Barba and Pateña 1991). Present efforts are concentrated on efficiently excising the endosperm, regenerating plantlets from the endosperm - derived callus and cytologically triploid plantlets.*

Branch Cutting Propagation of Five Bamboo Species Using IBA

Manuel Castillo

ABSTRACT

Increasing demand for bamboo necessitates the most efficient and effective nursery propagation and plantation cultural operation of different bamboo species. Culms are wasteful; branch cuttings are technologically economical and easier to handle. Combined Indole-Butyric Acid hormonal effects on rooting of five bamboo species performance were evaluated.

Species, type of branch and position of cutting were found to be highly significant in hormonal propagation of bamboo. More live cuttings with well developed shoots were found on the basal section of the primary branch treated with 100 ppm IBA. Likewise, the highest number of live cuttings were in the primary branch position.

Micropropagation of Banana and Rattan for Mass Distribution

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Two biotechnological techniques developed at the Institute of Plant Breeding (IPB) -- one by Damasco and Barba (1984) and the other by Pateña, Mercado and Barba (1984) -- were adopted by the IPB National Seed Foundation ***In Vitro*** *Propagation Laboratory for mass propagation of banana and rattan, respectively. The techniques involve: 1) the* ***in vitro*** *culture of shoot tips in the case of banana, and seeds in the case of rattan; 2) allowing the shoots to grow, proliferate and form roots; and 3) transplanting the plantlets to potting mix. With these techniques, a production capacity of 12,000 and 5,000 plantlets of banana and rattan, respectively, is targetted annually. Tissue-cultured banana plants that are free of banana bunchy top virus (BBTV) disease are now on sale at P15 (plants with 3-4 leaves) and P20 (plants with 5-8 leaves) each. Rattan plants will also be on sale toward the end of the year at P45 each.*

Tissue Culture of Garlic and Shallot

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ABSTRACT

Shoot tip explants (4-6 mm) of 11 strains of garlic (8 from the Philippines and 3 from Indonesia) and 19 strains of shallot (12 from the Philippines, 4 from Indonesia, 1 from Laos and 2 from Thailand) were initiated ***in vitro.*** *Initial results showed that addition of 4 mg/l 6-benzylaminopurine (BAP) to the culture establishment media [Murashige and Skoog's (MS) medium of formulation (Pateña et al.)] favored more vigorous growth. Multiple shoots were obtained using MS medium with 1-2 mg/l 2- isopentenyladenine (2-ip) and 0.5 mg/l napthaleneacetic acid (NAA) in case of garlic and 0.5 mg/l 6-benzylaminopurine (BAP) and 0.5 mg/l NAA in case of shallot* benzylaminopurine *(BAP) and 0.5 mg/l NAA in case of shallot.*

Mannitol added to the medium at 1-2% effectively controlled the rapid growth of leaves and thus minimized subculturing. Subculture of shoots was limited to three passages, after which the cultures died or formed bulbs ***in vitro.***

Somaclonal Variation and Induced Mutation in Ramie

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*Plant formation using shoot tip and single node explants of ramie (**Boehmeria nivea**), Acc 2 and 20, was obtained in ramie medium (RM), which is composed of modified (1/2 strength micronutrients) Murashige and Skoog's (MS) formulation supplemented with myo-inositol, sucrose and coconut water. RM is a modification of the medium used in embryo culture of bamboo (Zamora and Gruezo 1990). With the use of internode explants of Acc 2, 13, 18 and 20, compact, yellow to green nodular calli composed mostly of tracheids were obtained in modified hormone-free MS medium. Plantlet regeneration from calli was not observed.*

*Chemical mutagens, sodium azide (NaN_3) and ethylmethylsulfonate (EMS) were used to induce variability **in vitro**. NaN_3 at concentration 1.0 mg/l was found to be lethal to shoot tip and single node explants of Acc 2 and 20. EMS at the highest concentration (0.10%) tested was not. EMS-treated plantlets, when transplanted to potting mix, survived.*

The study is in progress and efforts are concentrated on regenerating plantlets from calli via somatic embryogenesis or organogenesis, obtaining chemically-mutated plants and evaluating these plants for high yield and good quality (low denier) fiber.

Development of Tissue Culture Techniques for Woody Species, Durian (*Durio zibethinus*), Mussaenda (*Mussaenda sp cv Dona Luz*) and Derris (*Derris elliptica*)

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ABSTRACT

*This study aims to determine the tissue culture requirements of three woody species: durian (**Durio zibethinus**), mussaenda (**Mussaenda sp** cv Dona Luz) and derris (**Derris elliptica**).*

Callus was induced from durian stem explants 38 days after inoculation onto Murashige and Skoog's (MS) medium (1962) supplemented with 0.5 mg/l each of 2,4-dichlorophenoxyacetic acid (2,4-D) and 6-benzylaminopurine (BAP). Loose, friable and vitrescent calli were initiated on the abaxial surface of leaf squares, midvein sections, petiole segments, stem sections and shoot tips of mussaenda cv Dona Luz. Calli grew a week after inoculation onto the same medium used for durian. In derris, callus was formed from internodes, nodes and axillary buds three weeks after inoculation onto two kinds of medium, hormone-free R medium (Pateña et al. 1978) and Shenck and Hildebrandt (SH) medium (1972) with either 1.0-2.5 mg/l BAP or 0.5-2.5 mg/l naphthaleneacetic acid (NAA).

Organogenesis was limited to root formation in derris and mussaenda on NAA-enriched SH medium. In derris, roots formed after 3-5 weeks in culture while in mussaenda, roots formed after a month in culture.

This study is in progress to complete the requirements for ***in vitro*** *culture of these three woody species.*

Reaction of Recovered Tungro-infected Taichum Native I Rice Plants to Elisa

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ABSTRACT

Tungro is the most destructive and widely distributed virus disease of rice in the Philippines. It is present and equally destructive in all the rice-producing countries of South and Southeast Asia. The viral nature of the disease has been established and confirmed through transmission, electron microscopy and serology, There have been observations and reports that symptoms of the disease disappear after a certain growth period. As virus-infected plants rarely, if ever, recover, the disappearance of tungro symptoms is ascribed to masking. However, no evidence has been presented to support this claim. Others held the opposite interpretation that the disappearance of tungro symptoms in the field and in the greenhouse is a manifestation of recovery.

Even Taichung Native I rice, a variety most susceptible to tungro, recovers from the disease as expressed by its normal vegetative growth with its tillering capacity restored and stunting reversed. Plants which have apparently recovered look as normal as their healthy counterparts. Leaf sections from original TNI plants infected with tungro showed positive reactions indicating the presence of bacilliform, spherical viruses and

their combination when indexed by ELISA (ELISA assays were conducted at the International Rice Research Institute). In first ratoon TNI plants, positive reaction only to baciliform virus was detected through ELISA. No trace of either virus was present in second ratoon plants when indexed by ELISA. Results of this and previous studies strongly suggest that the disappearance of tungro symptoms is a true and complete recovery and not a masking phenomenon.

Recovery from the disease seems to be affected by the variety, severity of symptoms and vegetative stage of infected plants. The principal requirement for recovery to occur is the exclusion of insect vectors from visiting and colonizing the diseased plants. The abnormal behavior of tungro-infected plants by recovering at any time of the year, naturally, en masse and permanently after freeing them from their insect vector leads the senior author to speculate on the possible involvement of insect toxin in tungro syndrome.

Chemical and Biological Studies on *Mikania cordata* (Burm. f.) B. L. Robinson

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ABSTRACT

*Chemical and biological studies were done on the plant **Mikania cordata** (Burm. f.) B. L. Robinson in an attempt to establish the scientific basis for its medicinal uses. Upon isolation and structure elucidation, the plant has yielded sesquiterpene lactones of the germacranolide type, flavonoids, sterol glucosides and glucosyl ceramides.*

While the crude chloroform extract exhibited antimicrobial and antimycobacterial properties, the purified chloroform extract indicated ***in vivo*** *anti-inflammatory effects. Enhanced antimicrobial activities, as well as anti-inflammatory effects, were detected in the fraction containing the mixture of sesquiterpene lactones.*

Scandenolide, the major sesquiterpene lactone isolated, was found to inhibit the production of the inflammatory mediators leukotriene B_4 and platelet activating factor (PAF) by isolated rat peritoneal leukocytes. However, the toxicity shown by the crude extract would limit the use of this medicinal plant.

A Multi Media Instructional Kit on Philippine Medicinal Plants

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The research aimed to develop an instructional kit for use in the teaching of Philippine medicinal plants. It employed the experimental and descriptive methods, dealing with developmental investigation and administration of a survey questionnaire.

The following conclusions were arrived at.

1. Information on Philippine medicinal plants can be transmitted through the print medium, through visuals and through the medium of sound.
2. The following audio-visual materials are practical components for an instructional kit on Philippine Medicinal Plants: botanical specimens, including herbaria, crude drugs and leaf collections; bottled herbal preparations; flat pictures; colored slides and transparencies; tapes; reading matters; and selected laboratory apparatus.

A kit guide in manual form can serve as a means of listing and explaining the contents of the instructional kit.

The kit guide is instructional in itself, providing additional activities to reinforce the teaching/learning of the various aspects of herbal technology.

From the above conclusions, it can further be generalized that educational technology can improve the quality of education through: (1) greater individualization of instruction; (2) a greatly enriched library of teaching materials; and (3) possible cost reductions.

RECOMMENDATIONS

1. There is a need to produce prototypes of this Instructional Kit on Philippine Medicinal Plants for distribution to involved agencies/institutions. These audio-visual materials can be utilized in the formal school system, as well as in informal set- ups.

2. This system may increase levels of awareness, interest and performance of students enrolled in science courses, particularly general science and botany.

3. Due to the lack of trained health workers in the remote rural areas, community workers may be taught, on a voluntary basis, to help improve health conditions through a more comprehensive primary health care program.

4. It is suggested that community programs involving health instruction include herbal technology specifically through non- formal classes.

5. Within the scope of the formal schooling system, it is recommended that each school allocate a portion of its campus for a Herbal Garden where each species of the common Philippine medicinal plants could be grown. The garden could be used for instruction and research purposes, as well as a source of crude drugs. Each representative plant should have a nameplate where the basic data on its identity and use are printed.

6. It is highly recommended that schools/faculty/students produce short films covering various aspects of herbal medicine. The following are suggested:

a. Agricultural aspect;

b. Phytochemical screening of Philippine medicinal plants;

c. Microbiological screening of Philippine medicinal plants;

d. Pharmacological screening of Philippine medicinal plants; and

e. Pharmaceutical aspect.

7. There is a need to establish a computerized Data Bank of Philippine medicinal plants for systematic and expeditious retrieval of data.

8. A follow-up study on the effectiveness of the instructional kit on Philippine medicinal plants in the teaching-learning situation is hereby proposed.