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Vol. 3 No 1. (January-June 2013)

TABLE OF CONTENTS

Foreword

Epistemological and pedagogical beliefs of preservice secondary science teachers on global climate change/*ARV Cajigal and DJ Tippins*

Guidance counselors' constructs of their role performance in interventions nurturing academe-community– workplace interface/*IL Flores and FF Rodrigo*

Pruning techniques for *Jatropha curcas* L. to increase seed yield production /*CL Samsam*

Growth of four lesser-used tree species in different potting mixtures and watering frequency/*JI Rosario, CL Samsam and DL Jamias*

Pest management in vegetable production: The case of the rainfed lowlands in Ilocos Norte/*LA Lutap and MI Atis*

Development of low-cost and rapid multiplication technique of tissue-cultured *Musa acuminate* (AA Group) cv. 'Lacatan' banana seedlings/*MLS Gabriel, MI Atis, AJ Badar and ME Pascua*

Increasing productivity of yam (*Dioscorea esculenta*) through improved cultural management practices/ *NB Legaspi and BS Malab*

Epistemological and Pedagogical Beliefs of Preservice Secondary Science Teachers on Global Climate Change

Aris Reynold V. Cajigal and Deborah J. Tippins*

Abstract

Global climate change is a socioscientific issue that is popular in socio-political, economic, and educational contexts. This study explored the epistemological and pedagogical beliefs of preservice secondary science teachers on global climate change. Specifically, it examined the experiences of preservice teachers that informed their perspectives on the issue, and the negotiations they anticipate when developing this topic in their classrooms. Employing an interpretive research methodology, data were collected from four preservice secondary science teachers through case study methods, in-depth interviews, and written products.

The analysis of data revealed that the preservice science teachers' epistemological and pedagogical beliefs on global climate change were in a dynamic relationship and bound by two significant points: a) Global climate change is a seemingly inevitable topic and b) Global climate change has a rightful place in the science curriculum. Perspectives on global climate change tended to be mediated by the preservice teachers' experiences with people, places, and events. More specifically, themes that emerged from the four case narratives through within-case and cross-case analyses were identified. Among these include: a) natural versus anthropogenic causes; b) information audit; c) relevance of the topic of global climate change to the individual lives of students; d) influence from family and friends; e) controversy surrounding global climate change transcends the scientific, political, and economic aspects of society; and f) classroom debate as a microcosm of the larger scientific community. Recognizing the controversial nature of global climate change, the preservice teachers plan to negotiate the teaching of this concept in terms of content, context, process, and outcomes vis-à-vis the implications of the findings.

***Keywords**: epistemology, pedagogical belief, climate change*

Guidance Counselors' Constructs of their Role Performance in Interventions Nurturing Academe-community- Workplace Interface

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Abstract

This qualitative inquiry explored guidance counselors' constructs of their roles in interventions that nurture academe-community-workplace interface. These interventions were spearheaded by the Mariano Marcos State University (MMSU) and Northwestern University (NU) in Ilocos Norte from January 2007 to December 2009. Data sets were gathered via in-depth interviews with six MMSU and ten NU guidance counselors. The explored constructs of their roles were grouped into themes and sub-themes.

Three major groups of interventions that nurture academe-community-workplace interface were identified. The most commonly-mentioned included those under academic development, followed by those under career development, and the least, those under personal-social development. All the interventions involved at least two groups of individuals like students and guidance counselors or concerned university personnel, while almost all involved members of the community (such as parents, guardians, and relatives) and workplaces (employers and staff), as well as those of the academe (both teaching and non-teaching personnel and students or even peer counselors).

Moreover, the roles identified were grouped as follows: administrative, communicative, technical, coordinative, instructional, leadership, and facilitative. All of which were evident in the roles performed by the counselor-informants when they engaged themselves in academic development interventions. Across the interventions, which were grouped into three, the counselor-informants construed the roles they played in terms of their purposes. These intentions were found to be directed toward the academic growth and welfare of students, the visibility of the concerned academic institutions, the effectiveness and relevance of the guidance and counseling program, the involvement of parents and prospective employers of graduates, and the sustainability of relationships between and among partners in the academe, community, and workplaces.

Aside from viewing the roles played by the counselor-informants based on their purpose, they were also interpreted in terms of their nature, importance, justification/rationale, strategies employed, and outcomes. When taken together, all these findings serve as anchor in ensuring a more comprehensive yet practical training—either formal or non-formal—for guidance counselors regardless of whether they are serving in a public or private institution of higher learning. Such training is needed in enabling guidance counselors to manage opportunities that nurture and maximize interfacing interventions.

***Keywords**: guidance counseling, guidance counselor's interventions, role performance, academe-community-workplace interface*

Pruning Techniques for *Jatropha curcas* L. to Increase Seed Yield Production

*Charito l. Samsam**

Abstract

In this study, the effects of different pruning heights and number of branches left were evaluated to determine the most effective pruning height and optimum number of branches to be left after branch thinning to increase seed yield production of *Jatropha curcas*. The experiment, which was conducted at the MMSU Experimental Station from 2009-2011, was laid-out in Split plot design and was replicated three times. The treatments were as follows: Factor A – (Pruning height) A_1 – No pruning; A_2 – 50 cm; A_3 – 60 cm; and A_4 – 70 cm and Factor B (number of branches left) B_1 – 8 branches; B_2 – 10 branches; and B_3 – 12 branches.

The main effects of pruning height were significant in all the parameters tested. *J. curcas* with 0.70 cm pruning height consistently produced the most number of branchlets (42.44), inflorescence plant^{-1} (78.33), fruit cluster^{-1} (7.11), as well as total fruits plant^{-1} (533.44), seed yield plant^{-1} (0.86 kg), and seed yield ha^{-1} 2161.47 kg). This was comparable in plants with 0.60 cm pruning height on the number of branchlets, number of inflorescence plant^{-1}, total number of fruits plant^{-1}, seed yield plant^{-1}, and seed yield ha^{-1}. The shortest period (8 days) to initiate flower buds was observed from the unpruned plants, however, they had the least results in all the other parameters.

Likewise, significant main effect of the number branches left after branch thinning was noted in all the parameters except on the number of days prior to flower bud initiation. *J. curcas* with 12 branches consistently exhibited the most number of branchlets (42.33), number of inflorescence plant^{-1} (74.92), fruit cluster^{-1} (6.01), total fruits plant^{-1} (467.92), seed yield plant^{-1} (0.71 kg), and seed yield ha^{-1} (1782 kg). Similar trends, however, were noted in plants with 10 branches in terms of the number of branchlets, number of inflorescence, and seed yield ha^{-1}. No interaction effect of pruning height and number of branches left was observed in all the other parameters tested.

***Keywords**: branchlets, branch thinning, fruit cluster^{-1}, inflorescence, top-pruning*

Growth of Four Lesser-used Tree Species in Different Potting Mixtures and Watering Frequency

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Abstract

This study determined the most suitable potting mixture and watering interval for raising quality seedlings of four lesser-used tree species such as *akleng parang* [*Albizia procera* (Roxb. Benth.], *kariskis* [*Albizia lebbekoidez (*D.C.) Benth.], *sakat* (*Terminalia nitens* Presl.), and *banaba* [*Lagerstroemia speciosa* (Linn.) Pers.]. The experiment was set-up at the MMSU Central Nursery, City of Batac, Ilocos Norte.

Results revealed marked effects of potting mixture and watering frequency on the percentage survival of *sakat*. Likewise, potting media and watering frequency affected the height increments of *akleng parang*, while potting mixtures affected the shoot-root ratio of *sakat* seedlings. In addition, significant interactions of potting mixture and watering frequency were observed on the: a) height and diameter increment and shoot-root ratio of *kariskis*; b) survival and height increment of *akleng parang*; c) height and diameter increments of *sakat*; and d) survival, height and diameter increments, and shoot-root ratio of *banaba*. Seedlings watered every two days had higher survival rate and increased on height and diameter faster than those watered at longer intervals.

The most promising potting media for producing seedlings of the four species are: a) *kariskis* – OGS alone, and OGS + RS (1:1 ratio); b) *akleng parang* – OGS alone and OGS + RS (1:1 ratio); c) *sakat* – OGS alone and OGS + rice hull (RH at 1:2 ratio); and d) *banaba* – OGS alone and OGS + RS (1:1 ratio). All the tree species should be watered every two days to ensure the production of quality seedlings.

***Keywords**: lesser-used tree species, nursery practices, potting media, watering frequency*

Pest Management in Vegetable Production:
The Case of the Rainfed Lowlands in Ilocos Norte

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Abstract

This survey was conducted in ten rainfed-lowland vegetable-growing towns in Ilocos Norte preferably within a rice-vegetable cropping system. It documented the farmers' pest management practices, determined their knowledge and attitudes toward pests and their management; and assessed pesticide residues of vegetables commonly planted in the lowland areas.

Farmers varied in their pest management practices and other cultural practices like sowing, planting and harvesting, spacing, irrigation, and fertilizer application. Most of them were dependent on inorganic fertilizers and synthetic chemical pesticide spray. Their practices influenced the growth and development of their plants.

Moreover, farmers were knowledgeable on the insects and weeds attacking their plants, but not on diseases. The major insect pests were aphids (*Aphis craccivora*, Koch.), fruitworm (*H. armigera* Hubner), thrips (*Thrips palmi* Karny), fruitborer (*L orbonalis* Guenee), fruitfly (*Bactrocera* sp.) and diamondback moth (*P. xylostella* L.); while the major diseases were damping off, bacterial wilt, mosaic, purple blotch and tangle top caused by pathogenic organism like fungus, bacteria and viruses. On the other hand, the weed species associated with their crops were bermuda grass (*C. dactylon),* pig weed *(T. portulacastrum)*, jungle rice (*E. colona)*, Chinese lantern (*C. halicacabum),* and purple nutsedge (*C. rotundus)*. To control these pests, farmers relied on chemical pesticide spray. Pepper, eggplant, bittergourd, pole sitao, tomato and cabbage were mostly sprayed with pesticides. Related to this, pesticide residues were detected in some vegetables sampled directly from farmers' field and in the local market through the pesticide residue kit for carbamates and organophosphate residues. All the vegetables sampled in the local market exhibited positive results for carbamates, except for cabbage and sweet pepper, which had residues of organophosphate.

On the whole, the present cultural practices of the farmers could lead to pest outbreak or resurgence such as unsynchronous planting, excessive nitrogen fertilizer use, but limited amount of phosphorous and potassium, and poor seed reliance. These practices of Ilocos rainfed-lowland farmers would aggravate insect pest and disease problem in producing vegetables. Other constraints that were identified other than pests were lack of capital, lack of quality seed material, natural calamities like drought and typhoon/flood, and labor.

Keywords*: pest management, rainfed lowlands, vegetable production, pesticides*

Development of Low-cost and Rapid Multiplication Technique of Tissue-cultured *Musa acuminate* (AA Group) cv. 'Lacatan' Banana Seedlings

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Araceli J. Badar and Miriam E. Pascua

Abstract

In vitro multiplication and nursery management techniques were developed for the production of *Musa acuminata* (AA Group) cv. 'Lacatan' banana seedlings at the Mariano Marcos State University from 2005 to 2007.

In vitro is focused on the formulation of cheaper media formulation, which used low-cost materials as substitute to chemical components. Other institutions have been using the Murashige and Skoog (MS) formulation with the addition of 5 ppm Benzyl Amino Purine, (BAP) 2% sucrose and 4.5 grams Biolife agar using distilled water to volume the culture media. By substituting those items, however, the results on the growth of plantlets were comparable with the existing culture media used. Likewise, the same quality and quantity of plantlets were obtained incurring lower cost of production.

The MMSU proposed media was applied both for shoot proliferation and root induction of *in-vitro* banana. For shoot proliferation, the cost for one shoot/meriplant was P0.20 using the existing media, while P0.02 using the proposed media. Likewise the cost for rooting one plantlet was P0.64 and P0.26 for the existing and the proposed media, respectively. The total cost of producing one plantlet (from shoot proliferation to root induction) is P0.84 using the existing media and P0.28 using the proposed media.

Some nursery management techniques that were established include the following: tissue-cultured banana plantlets can be potted out in a soil mixture of 2:1 ratio of carbonized rice hull and ordinary garden soil to obtain more vigorous plantlets; pot out 3 to 10 cm tall plantlets with bottle covering for 7 days; these plantlets are let open for 3 days; placed under the sun with partial shade, thereby obtaining a higher plantlet survival.

Another technique for better seedling performance was the application of urea. The rate of one tablespoonful was drenched daily to one-month old seedlings. This technique increased their height at 4 weeks after application (56.73 cm). Smaller plants were obtained when urea solution of two and three tablespoonful per 16 liter water was drenched every other day (51.49 cm) and once a week (43.20 cm). The establishment *of in-vitro* techniques and nursery management for the production of cv. *Lacatan* banana seedlings provided some benefits both to the researchers and the farmer-clientele.

***Keywords**: banana, in vitro, shoot proliferation, root induction, nursery management techniques*

Increasing Productivity of Yam (*Dioscorea esculenta*) through Improved Cultural Management Practices

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Abstract

Yams (*Dioscorea*) play a vital role as source of human food in the country especially in times of food scarcity. *D. esculenta*, locally known as tugui, is one of two species, which are economically important in the Ilocos Region. Tugui thrives well in marginal areas and is considered as a cash crop by upland farmers. To date, no production technology has so far been developed for this crop, the reason why productivity is very low at farmer's field (2.6 t ha^{-1} – 3.3 t ha^{-1}). Assessment of the farmer's current production practices shows the need to fine-tune some of its component, the most critical of which pertains to fertilizer and seed management. Hence, field experiments were conducted along these lines to improve the existing cultural management practices for increased productivity.

Results show that tugui can be successfully grown for three consecutive years without using fertilizer, as tugui farmers have been practicing since, with yields comparable with those applied with organic and inorganic fertilizers. Soil analysis, however, shows a declining trend in soil fertility of the unfertilized plots, implying the depletion of the soil's natural fertility, which might cause the drastic decline in yield after three consecutive cropping seasons as claimed by farmers. However, applying two tons of organic fertilizer per hectare was found to sustain high yield and maintain the residual fertility of the soil after continuous cropping. With this, the capacity of the soil to produce high yield is sustained; therefore, shifting cultivation, a common practice of tugui growers, is minimized. In addition, the use of bigger setts (40-89 g) was found to significantly produce more vigorous plants and higher crop stand, resulting to an increase in yield by 138% as compared to the farmers' practice of using small setts.

Keywords: *yam, marginal, improving cultural management practices*