

was measured by a competitive direct enzyme-linked immunosorbent assay (CD-ELISA), a highly sensitive and accurate procedure based on the manufacturer's instructions. Aflatoxin is very heat-stable, is 200 times more potent than benzopyrene as a carcinogen, and has been shown to be fully carried over to the resulting environmental tobacco smoke (ETS). Chronic exposure of the general population to aflatoxin-containing ETS is a common occurrence locally and globally because of the high percentage of smokers worldwide. In concert with low levels of aflatoxin in foodstuff, inhaled aflatoxin could be a major factor adversely affecting the immune system because this toxin is also known to be a strong immunosuppressant aside from being a potent carcinogen.

Keywords: aflatoxin, carcinogen, immunosuppressant, ETS, CD-ELISA

SOCIAL SCIENCES

SSD No. 1

SUSTAINING THE SAMPAGUITA FLOWER/GARLAND LIVELIHOOD SYSTEM IN PERI-URBAN METRO MANILA

**Mario Navasero¹, Marcela Navasero², Constancio de Guzman³,
Cristina Bajet⁴, and Raul Boncodin^{5*}**

¹National Crop Protection Center (NCPC), College of Agriculture
University of the Philippines Los Baños (UPLB-CA), College, 4031 Laguna

²Plant Pest Clinic, Department of Plant Pathology,
UPLB-CA, College, 4031 Laguna

³Department of Horticulture, UPLB-CA, College, 4031 Laguna

⁴NCPC, UPLB-CA, College, 4031 Laguna

⁵International Potato Center – Users' Perspectives With Agricultural Research
and Development Network and CGIAR Urban Harvest Program
(CIP-UPWARD/Urban Harvest)

Elvira Tan Hall, PCARRD Complex, Los Baños, 4030 Laguna

Email: cip-manila@cgiar.org

Sampaguita (*Jasminum sambac*) flower production, garland making and marketing are traditional livelihood activities within and around Metro Manila. A collaborative, interdisciplinary research initiated in 2001 sought to: (1) assess

the sampaguita livelihood systems in peri-urban Metro Manila, (2) identify key problems and opportunities for sustainable flower production and garland-making, and (3) develop and introduce appropriate technologies based on the priority problems and opportunities.

Survey results indicated that the sampaguita livelihood system extends from urban marketing centers in Metro Manila to rural production areas in Pampanga and Quezon. It involves eight livelihood actors: farmers, flower pickers, flower suppliers, fiber cleaners, flower vendors, garland-making contractors, garland makers, and garland sellers. Farmers had the highest estimated annual incomes at P238,800. San Pedro, Laguna represents the peri-urban nexus of the entire livelihood system, being the major center for flower trading and garland-making.

Socio-technical assessment identified two priority concerns:

- (1) Heavy pesticide use during peak production season, with two-thirds of respondents sprayed every 1-2 days, and 97% of them spraying less than 24 hours before harvesting. Skin allergy, vomiting, dizziness, headache and itchiness were reported by sampaguita workers. Laboratory analysis detected malathion and diazinon residues for 100% and 92% of samples respectively.
- (2) Declining flower productivity of old plants, whose average age was estimated at 17 years. Farmers dislike replanting because of temporary loss of income while waiting for the new plants to mature.

The project's current two-pronged research and development intervention for peri-urban sampaguita livelihood includes: 1) participatory on-farm trials to compare farmer's and introduced pest management practices, as initial step in the development of IPM anchored on correct pest diagnosis and appropriate pesticides; and 2) horticultural evaluation of an exotic sampaguita variety, as initial step in promoting varietal diversity, encouraging replanting in old sampaguita farms, and stimulating market demand for new products.

Keywords: urban agriculture, sampaguita, livelihood system analysis, integrated pest management

SSD No. 2

**EFFECTS OF PRUNING AND BAGGING TECHNOLOGIES ON
PRODUCTIVITY AND COST IN MANGO PRODUCTION IN SELECTED
AREAS IN THE PHILIPPINES**

**Maria Excelais M. Orden, Aurora S.
Paderes, Jocelyn L. Aveno, and Analou L. Santos**

**Central Luzon State University, Science City of Munoz,
3119 Nueva Ecija, Philippines
Email: maexcelsis@yahoo.com**

A total of 332 mango producers in selected major producing areas in Luzon, Visayas and Mindanao interviewed to analyze the impacts of pruning and bagging technologies on fruit quality, reduction in the use of chemicals, change in pest management cost structure, effects on productivity, and net income over pest management cost. Insect pests of mango are controlled using chemicals of different active ingredients ranging from CAT 2 to CAT 4. Pruning reduced the volume and cost of chemicals. It has decreasing effect on the cost of pest management as indicated by the estimated cost function. Pruning is a yield increasing technology based on Cobb-Douglas production function. Technically with pruning, there could be better light penetration, and pest and diseases could be reduced by destroying unproductive and damaged branches. Bagging protects mango from insect pests. It reduced the number of sprayings by two times, resulting in lower volume and cost of chemical control. But, bagging is relatively costly, hence it did not significantly reduce the cost of pest management. Bagging numerically increased yield, resulted in higher proportion of harvest sold to exporters in Luzon, not to mention in other two areas. In view thereof, net revenue above pest management cost of bagging adopters in Luzon was numerically higher than the non-adopters by about P500 per tree; not significant though, but a big opportunity cost among small farmers with limited capital in production. Bagging could have long-term benefits to the environment and the "mango-eating" public due to reduction in the use of chemicals. If bagging is practiced predominantly, the danger of environmental pollution and accumulation of the ill-effects of inorganically sprayed chemicals on the health of workers, households members and consumers could be minimized.

Keywords: pruning, bagging, mango, Cobb-Douglas production function, cost function

SSD No. 3

**PESTICIDE REGULATION AND FARMERS' EDUCATION ON RICE
PRODUCTION IN NUEVA ECJA, PHILIPPINES:
AN ECONOMIC ANALYSIS**

Maria Excelsis M. Orden^{*1} and Isabelita M. Pabuayon¹

¹Central Luzon State University, Science City of Munoz,
3119 Nueva Ecija, Philippines
Email: maexcelsis@yahoo.com

²University of the Philippines Los Banos, College, 4031 Laguna, Philippines

The effects of regulatory program for pesticides and farmers' education through Farmers' Field School (FFS) on the pattern of pesticide use from 1990s to 2000 at the macro level and farm level using IRRI-PhilRice data were determined.

Insecticide use in the country has generally been increasing as indicated by rising imports and sales. Government tariff and pricing policies reduced the disincentive to use chemicals in agricultural production based on decreasing implicit tariff; but provided higher potential incentive to domestic formulation based on increasing effective protection rate. Nevertheless, the government appeared to have been successful in minimizing the availability and use of extremely hazardous chemicals in favor of least toxic ones through regulation.

At the farm level, regulation changed the pattern of pesticide use of farmers; from monocrotophos and endosulfan to other chemicals of lower toxicity, but entailed higher volume to compensate for potency loss to attain the equivalent pest control. Farmers' education as a complementary policy reduced pesticide use because of better understanding of insects' threshold level. The aggregate cost of material inputs and net income above material cost of farmers were not reduced significantly. But if net income could be improved through appropriate input and pricing policies there could be incentive to continually adopt IPM technology rather than chemical control. In the long run, this could result in healthier population and safer environment. The favorable impact of education on yield tends to be cumulative based on the estimated bio-economic and Cobb-Douglas production functions. Through time, farmers gained more knowledge and better understanding of the dynamics of the ecosystem that improved their decision-making to enhance yield.

In view of the positive impact of farmers' education on continued use of harmful chemicals, the government needs to strengthen its efforts to educate more farmers from other areas and in other crops on IPM technology through FFS.

Keywords: pesticide use, pesticide regulation, farmers' field school, bio-economic production function, Cobb-Douglas production function

SSD No. 4

A FARMER-PARTICIPATORY APPROACH IN THE ADAPTATION AND ADOPTION OF CONTROLLED IRRIGATION FOR WATER-SAVING: A CASE STUDY IN CANAREM, VICTORIA, TARLAC, PHILIPPINES

Flor G. Palis¹, P.A.A. Cenas^{1*}, B.A.M. Bouman², M. Hossain¹, R.M. Lampayan², A.T. Lactacen³, T.M. Norte³, V.R. Vicmudo³, and G.T. Castillo⁴

¹Social Sciences Division, ²Crop Soil and Water Division
International Rice Research Institute (IRRI),
DAPO Box 7777, Metro Manila, Philippines

³ National Irrigation Administration, Groundwater,
Irrigation System Reactivation Project
Tarlac, Philippines, and ⁴Consultant, IRRI

With the current problem of water scarcity, a water saving technology called controlled irrigation or alternate wet and drying technique was tested for farmers' adaptation and eventual adoption using a farmer participatory approach. This technology can increase irrigation efficiency, water distribution equity, and farmers' income through the reduction of irrigation costs. The study was conducted in Canarem, Victoria, Tarlac among members of P38 Irrigation Service Cooperative (ISC) to explore various factors that would insure adoption of this water saving technology. Preliminary results showed group size, area size, irrigation cost, transparency in the management of irrigation service cooperative, strong leadership, and institutional factors such as cohesive partnership among National Irrigation System, local government, and ISCs are major factors for feasible implementation and farmers' adoption.

Keywords: controlled irrigation, alternative wet and drying technique, water-saving

SSD No. 5

**POPULATION DATA OF THE 15 PHILIPPINE REGIONAL CENTERS
AT FIVE STR MARKERS:
A LOOK INTO OUR GENETIC HISTORY**

**M.M. Tan, G.C. Calacal, E.C. Deffin, K.A. Tabbada, M.P. Tan, J.C. Ferreon,
H.B. Perdigon, Saturnina C. Halos, and Ma. Corazon A. De Ungria**

DNA Analysis Laboratory, Natural Sciences Research Institute
University of the Philippines, Diliman, Quezon City, Philippines

The Philippine archipelago lies at a crossroads between mainland Asia and Oceania and is thought to have served as a link between these two regions. Many groups in the Philippines share cultural affinities with both Polynesia and Asia. The geographical barriers presented by an archipelago have given rise to subpopulations with their own language, culture and religion. We study 15 regional populations in the Philippines using five Short Tandem Repeat (STR) markers –HUMvWA, HUMF13A01, HUMFES/FPS, HUMFOLP23 and D8S306– to analyze population relationships and dispersals among groups.

Blood or buccal swab samples ($N=1,362$) were obtained from 15 urban regional centers and processed as previously described. Frequencies were determined using the gene count method. Chi-square homogeneity tests were performed using Popgene software. Co-ancestry distance and dendograms were generated using GDA software ver 1.1.

Cp-ancestry coefficient values (F_{st}) range from 0-0.1, indicating low overall genetic diversity among Philippine urban groups. However, chi-square tests show that the Philippine population is not homogenous at three markers (HUMF13A01, HUMFES/FPS and HUMFOLP23). Analysis of 15 region using UPGMA revealed two main clusters (A and B), with cluster B subdividing into B1 and B2; Region 6 is an outlier.

Clustering of regions is consistent with their geographical location and predominant language. Low F_{st} values support the presence of an initial core group that peopled the Philippines; interactions of this core population with other Asian groups may have resulted in the genetic variations and heterogeneity of modern Philippine regional populations. This is particularly important when interpreting data of multi-center studies on relationships between Filipinos and different Asian groups. Northern Philippine groups more interactions with Taiwan and China, while southern regions have stronger ties to Indonesia and Malaysia. Further work to expand the number of DNA markers studies and compare Philippine populations with other Asian populations is underway.

Keywords: Philippines, short tandem repeat, population studies, co-ancestry coefficient, F_{st}