



NATIONAL ACADEMY OF SCIENCE  
AND TECHNOLOGY

**16<sup>th</sup> ANNUAL SCIENTIFIC MEETING**  
**VISIONS FOR PHILIPPINES 2000**

**Philippine International Convention Center**  
**Roxas Boulevard, Manila**  
**13-14 July 1994**

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*(This serves as an Invitation)*

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## PROGRAM OF ACTIVITIES

JULY 13, 1994  
MORNING

7:00	<b>REGISTRATION</b>	Lobby
8:00	<b>OPENING CEREMONIES</b>	Meeting Room 4
	<b>Processional</b>	
	<b>Entry of Colors</b>	<b>UP Rayadillo</b>
	<b>National Anthem</b>	
	<b>Invocation</b>	<b>Academician Bienvenido F. Nebres, S.J.</b>
	<b>Welcome Address</b>	<b>Academician Conrado S. Dayrit</b> President National Academy of Science and Technology
	<b>Awarding of Winners</b>	<b>Academician Conrado S. Dayrit</b> assisted by  Undersecretary Department of Science and Technology
		<b>Outstanding Published Papers ( pages 23 - 24 )</b>
		<b>Outstanding Publications (page 25 )</b>
		<b>Outstanding Young Scientists (pages 30 - 32 )</b>
		<b>NAST-TWAS Science Prize (page 33 )</b>
	<b>Investiture of New Academician</b>	
		<b>Perla D. Santos-Ocampo, M. D. - Pediatrics</b>

**Special Number**

**Introduction of Guest Speaker**                      **Academician Dolores A. Ramirez**  
Vice-President  
National Academy of Science and Technology

**Guest Speaker**                              **Dr. Cielito F. Habito**  
Director General  
National Economic and Development Authority

**Master of Ceremonies:**    **Academician Mercedes B. Concepcion**

10:00    **Opening of Poster Session**    **Meeting Room 7**  
            **Ribbon Cutting**                      **Mrs. Milagros M. Dayrit**

10:30    **PLENARY SESSION I**    **Meeting Room 4**

**"Issues on Population: Nutrition, Children, Public health and Healthcare Financing"**

Speaker:                                      **Academician Ernesto O. Domingo**

Panelists:                                      **Mr. Antonio C. Abaya**  
Columnist  
The Manila Chronicle

**Dr. Thelma Navarrete-Clemente**  
President  
Philippine Hospital Association

In Consultation with:

President  
Nutrition Foundation of the Philippines

**Dr. Amelia Fernandez**  
President  
Philippine Pediatrics Society

**Dr. Leda Layo-Danao**  
President  
Philippine Nurses Association

**Dr. Adriano V. Laudico**  
President  
Philippine College of Surgeons

**Dr. Dante D. Morales**  
President  
Philippine College of Physicians

**Dr. Ruben C. Navia**  
President  
Philippine Dental Association

**Mr. Mario P. Fadiullon**  
President  
Pharmaceutical and Healthcare Association

**Dr. Teodulo M. Topacio, Jr.**  
President  
Philippine Society of Veterinary Public Health

Moderator: **Academician Gelia T. Castillo**  
Rapporteur: **Academician Quintin L. Kintanar**

12:00 **OPEN FORUM**

Moderator: **Academician Gelia T. Castillo**

12:45 **B r e a k**

JULY 13, 1994  
AFTERNOON

2:00 **PLENARY SESSION II**

**"The Challenge of Economic Restructuring Toward NICdom:  
Issues for the Economics and Statistics Research Sector"**

**Speaker:** **Dr. Ponciano S. Intal, Jr.**  
President  
Philippine Institute for Development Studies

**Panelists:** **Mr. Allan Robles**  
Editor  
The Manila Chronicle

**Dr. Margarita F. Guerrero**  
Director  
Industry and Trade Statistics Department  
National Statistics Office

In consultation with:

President  
Philippine Computer Society

**Dr. Rey Peña**  
Chief III  
Bureau of Higher Education  
Department of Education, Culture and Sports

**Dr. Rodolfo Borjal**  
Representative  
Philippine Social Science Council

**Moderator:** **National Scientist José Encarnacion, Jr.**  
**Rapporteur:** **Academician Bienvenido O. Juliano**

3:30 **OPEN FORUM**

**Moderator:** **National Scientist José Encarnacion, Jr.**

4:15 **Coffee**

JULY 14, 1994  
MORNING

Meeting Room 4

7:00      **REGISTRATION**

8:00      **PLENARY SESSION III**

**"States of the Art in Animal and Crop Sciences"**

Speakers:      **Academician Ruben L. Villareal**  
Chancellor  
UP Los Baños

**Dr. Cecillo R. Arboleda**  
Dean  
College of Agriculture  
UP Los Baños

Panelists:      **Mr. Rudy Fernandez**  
Reporter  
The Philippine Star

**Mrs. Francisca Bawayan**  
Executive Director  
Church-Based Consumer Movement

In consultation with:

**Dr. Francisco F. Peñalba**  
President  
Philippine Society of Animal Science

**Dr. Flordeliza B. Javier**  
Chair  
Federation of Crop Science Societies of the Philippines

Director  
Bureau of Animal Industry  
Department of Agriculture

**Dr. Jose V. Valenzuela**  
President  
Philippine Veterinary Medical Association

**Mr. Alfredo T. Gonzales**  
President  
Pest Management Council of the Philippines

Modertor: **Academician Rafael D. Guerrero III**  
Rapporteur: **Academician Salcedo L. Eduardo**

9:30 **OPEN FORUM**

**Moderator: Academician Rafael D. Guerrero III**

10:00 **POSTER SESSION**

10:30 **PLENARY SESSION IV**

**"Issues on Environmental Science and Sustainable Development"**

Speaker: **Mr. Maximo Kalaw, Jr.**  
President  
Haribon Foundation, Inc.

Panelists: **Ms. Jessica Soho**  
Newscaster  
Channel 7

**Dr. Ricardo Serrano**  
Chair  
Pollution Adjudication Board  
Department of Environment and Natural Resources

**Dr. Benjamin Bagadion**  
Undersecretary  
Department of Environment and Natural Resources

In consultation with:

**Mr. Ariel Almendral**

General Manager  
Laguna Lake Development Authority

**Ms. Rachel Vasquez**

Director  
Environmental Management Bureau  
Department of Environment and Natural Resources

**Prof. William Fernandez**

Representative  
Philippine Society for Microbiologists

Moderator: **Academician Edgardo D. Gomez**  
Rapporteur: **Academician Filomena F. Campos**

12:00 **OPEN FORUM**

**Moderator: Academician Edgardo D. Gomez**

12:45 B r e a k

JULY 14, 1994  
AFTERNOON

2:00 **PLENARY SESSION V**

**“Energy Needs in Industry”**

Speaker: **Dr. Francisco L. Viray**  
President  
National Power Corporation

Panelists: **Mr. Herman M. Montenegro**  
President  
Philippine Chambers of Commerce

**Prof. Ester A. Garcia**  
Institute of Chemistry  
UP Diliman



**Dr. Roger R. Posadas**

Chancellor  
UP Diliman

In consultation with:

**Dean Alfredo Juinio**

President  
UP Engineering Research and Development Foundation

**Dr. Rogelio A. Panlasigui**

Director  
Industrial Technology and Development Institute

**Dr. Estrella F. Alabastro**

Executive Director  
Philippine Council for Industry and Energy Research and  
Development

Moderator: **Academician Bienvenido F. Nebres, S. J.**

Rapporteur: **Academician Apolinario D. Nazarea**

3:30 **OPEN FORUM**

Moderator: **Academician Bienvenido F. Nebres, S.J.**

4:00 **CLOSING CEREMONIES**

**Introduction of Guest  
Speaker**

**Academician Dolores A. Ramirez**  
Vice-President  
National Academy of Science and Technology

**Guest Speaker**

**Dr. William G. Padolina**  
Undersecretary  
Department of Science and Technology

**Closing Remarks**

**Academician Jose O. Juliano**  
Secretary  
National Academy of Science and Technology

4:30 **B r e a k**



## POSTER SESSIONS

July 13-14, 1994

**Meeting Room 7**

Authors will be available for discussion on:

*July 13, 1994 - 10:00 to 10:30 A.M.*

*July 13, 1994 1:00 to 2:00 P.M.*

*July 13, 1994 - 4:30 to 5:00 PM*

*July 14, 1994 10:00 to 10:30 A.M.*

*July 14, 1994 - 1:30 to 2:00 P.M.*

### **MATHEMATICAL, PHYSICAL AND ENGINEERING SCIENCES**

<b>Title of Paper</b>	<b>Presenter/Address</b>
<b>Kinetic Properties of Separated Solid-Liquid Fractions of Blended Swine Waste Slurry</b>	<b>Jose Ali F. Bedaño</b> UP Visayas Miag ao, Iloilo
<b>Side Chain Liquid Crystal Polymers as Binders in PDLC Films</b>	<b>Leonorina G. Cada</b> Institute of Chemistry UP Diliman, Quezon City
<b>Foundations of Pseudogroup Theory</b>	<b>Raoul E. Cawagas</b> SCITECH R&D Center Polytechnic University of the Philippines Sta. Mesa, Manila
<b>AXIOMS - An Algorithm for the Analysis of Finite Algebraic Structures</b> (Raoul E. Cawagas and A.Z. Rosal)	<b>Raoul E. Cawagas</b> SCITECH R&D Center Polytechnic University of the Philippines Sta. Mesa, Manila

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**Passive Solar Energy System for Crop and Food Drying**

(Samuel S. Franco, R.C. Castro, C.S. Sambo, and H.L. Layaoen)

**Samuel S. Franco**

National Tobacco Administration  
Batac, Ilocos Norte

**On Induced Cycles and Hamiltonian Cycles**

**Severino V. Gervacio**

Institute of Mathematical Sciences  
and Physics  
UP Los Baños, Laguna

**Development of New Process for Coconut Oil Extraction**

(Chay B. Pham and N.C.G. Liwag I.)

**Chay B. Pham**

BIOTECH  
UP Los Baños, Laguna

**Lahar and Sand Dunes as Raw Materials in the Manufacture of Structural Clay Products**

(Samuel S. Franco, R.V. Dejepto, and D.C. Pondoc)

**Samuel S. Franco**

National Tobacco Administration  
Batac, Ilocos Norte

**Design of a Highly Stable Optical pH for Bio-Reactor Monitoring**

(Nena Rodriguez and O.S. Wolfbeis)

**Nena V. Rodriguez**

Research Center for the Natural Sciences  
University of Santo Tomas  
España, Manila

**Piezoelectric Quartz Resonator as a Biosensing Device for Odorant Molecules**

**Fortunato B. Sevilla III**

Research Center for the Natural Sciences  
University of Santo Tomas  
España, Manila

**Computer-Automated Data Acquisition Forecasting and Device Control for Industrial Applications**

**Arthur It. Tambong**

College of Agriculture  
Mindanao State University  
Marawi City

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## BIOLOGICAL SCIENCES

**Morpho-Anatomical Studies of In Vitro Cultured Node Explants of *Dioscorea alata* L.**

**Cecilia B. Amoroso**  
Department of Biology  
Central Mindanao University  
Musuan, Bukidnon

**Studies on Some Useful Ferns in Mindanao**

**Victor B. Amoroso**  
Central Mindanao University  
Musuan, Bukidnon

**Homozygosity and Field Performance of Spineless *Ricinus communis* L.**  
(Adoracion T. Arañez and M.B.I. Bacano)

**Adoracion T. Arañez**  
Natural Sciences Research Institute  
UP Diliman, Quezon City

**Screening and Characterization of Microorganisms for Coal Biosolubilization**  
(Evelyn Battad-Bernardo, S. Negoro and I. Urabe)

**Evelyn Battad-Bernardo**  
Natural Sciences Research Institute  
UP Diliman, Quezon City

**Metazoan Parasites from Three Species of Philippine Groupers**

**Nellie C. Lopez**  
Institute of Biology  
UP Diliman, Quezon City

**Glycine in Fish Central Nervous System After Exposure to Manganese**  
(Glorina N. Pocsidio and E.S. Catap)

**Glorina N. Pocsidio**  
Institute of Biology  
UP Diliman, Quezon City

**Cloning of the Red Pigment Genes of *Xenorhabdus luminescens* HM1<sup>o</sup>**  
(Prima C. Ragudo Franco and K. H. Nealson)

**Prima C. Ragudo-Franco**  
Mariano Marcos State University  
Batac, Ilocos Norte

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**Utilization of Polymerase Chain Reaction  
in Cloning and Sequencing of Genes:  
*Xanthomonas oryzae* pv. *oryzicola***

**Asuncion K. Raymundo**  
Institute of Biological Sciences  
UP Los Baños, College, Laguna

## **AGRICULTURAL SCIENCES**

**Impact of Sweetpotato Based Household  
and School Gardening Project**  
(Elizabeth B. Alupias and B.T. Gayao)

**Elizabeth B. Alupias**  
Benguet State University  
La Trinidad, Benguet

**Growth Performance of Goats Fed with  
Napier, Supplemented with Desmanthus  
at Two Rates and Feeding Intervals**  
(Zosimo M. Battad and G.M. R. Recta)

**Zosimo M. Battad**  
Mariano Marcos State University  
Batac, Ilocos Norte

**Stem Borers Attacking *Gmelina arborea***

**Ricardo C. Braza**  
Paper Industries Corporation of  
the Philippines  
Tabon, Bislig, Surigao del Sur

**Beneficial Arthropods Regulating Population  
of Major Insect Pests on Cotton**  
(Nenita D. Cacayorin, M.D. Damo, A.D.  
Solsoloy and T.S. Solsoloy)

**Nenita D. Cacayorin**  
Cotton Research and Development  
Institute  
Batac, Ilocos Norte

**Effects of Calcium and Phosphorus  
Supplementation on Some Production  
and Reproduction Parameters in Growing  
Philippine Indigenous Sheep**  
(Rogelio R. Caluya and C.C. Sevilla)

**Rogelio R. Caluya**  
Mariano Marcos State University  
Batac, Ilocos Norte

**Calcium and Phosphorus Requirements  
of Growing Philippine Indigenous Sheep**  
(Rogelio R. Caluya and C.C. Sevilla)

**Rogelio R. Caluya**  
Mariano Marcos State University  
Batac, Ilocos Norte

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**Development of Other Uses of Tobacco**  
(Reynaldo C. Castro, S. C. Agrupis, J.R. Garcia, J. L. Lorenzo, and M.L.M. Palada)

**Reynaldo C. Castro**  
National Tobacco Administration  
Batac, Ilocos Norte

**Performance and Constraints to Adoption of Cotton Production Technologies**  
(Luciana T. Cruz, F.P. Julian, El. V. Santiago, and G.A. Rosario)

**Luciana T. Cruz**  
Cotton Research and Development Institute  
Batac, Ilocos Norte

**Microbial Inoculation for Quality Organic Fertilizers from Farm Wastes**  
(Bayani M. Espiritu, J.E. Remoquillo, L. B. Willauer, and C. Coroza)

**Bayani M. Espiritu**  
BIOTECH  
UP Los Baños, Laguna

**Participatory on-Farm Sweetpotato Varietal Evaluation Selection in the Philippine Highlands**  
(Zenaida N. Ganga, E.O. Badol, B.A. Anselmo, M.C.T. Posa, and C.C. Sagudan)

**Zenaida N. Ganga**  
Benguet State University  
La Trinidad, Benguet

**Performance of Gmelina arborea with Vam Inoculation in Acid Soil**  
(Dominador G. Gonzal, L.U. dela Cruz, and D.P. Garrity)

**Dominador G. Gonzal**  
Department of Forestry  
Visayas State College of Agriculture  
Baybay, Leyte

**Sweetpotato Household Gardening Development**  
(Betty T. Gayao, E.B. Alupias, J.M. Sim, H.L. Quindara, I.C. Gonzales, and E.O. Badol)

**Betty T. Gayao**  
Benguet State University  
La Trinidad, Benguet

**Cooperative Operation and Performance of Cotton Farmer's Associations (CFAs)**  
(Vicente A. Martinez and V.B. Gascon)

**Vicente A. Martinez**  
Cotton Research and Development Institute  
Batac, Ilocos Norte

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**Development of Double Endosperm  
Mutant Varieties in Maize**

(Manuel L. Logroño, A.B. Burgonio, F.M.  
Rodriguez and E.P. Gibas)

**Manuel L. Logroño**

Institute of Plant Breeding  
UP Los Baños, Laguna

**Body Temperature , Respiratory Frequency  
and Heart Rate Patterns under Thermo-  
neutral and Short-Term Therman Stress  
in Goats**

**Job M. Matias**

Dairy Training & Research Institute  
UP Los Baños, Laguna

**Challenges and Prospects of Sustaining  
Sugarcane Productivity**

**Teodoro C. Mendoza**

Department of Agronomy  
UP Los Baños, Laguna

**Maximum Likelihood and Bayesian  
Estimators for Insect Damage on Rice**

**Mariano B. de Ramos**

Institute of Mathematical Sciences  
and Physics  
UP Los Baños, Laguna

**Postharvest Loss Assessment in  
Yambean and Ginger at Various  
Handling Points**

**Violeta B. Salda**

Benguet State University  
La Trinidad, Benguet

**Hormonal Effect of *Jatropha curcas* L.  
Oil on *Helicoverpa armigera* (HUBN.)**

(Aida D. Solsoloy and B. M. Rejesus)

**Aida D. Solsoloy**

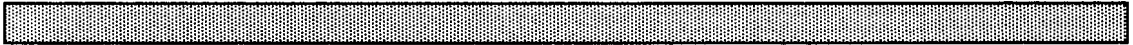
Cotton Research and Development  
Institute  
Batac, Ilocos Norte

**Comprehensive Rubber Technology  
Transfer Program (CRTTP)**

(Leonila M. Tolentino, E.A. Alcala, A.G.  
Bautista, R.S. Callano, R.O. Sarmiento,  
A.C. Bandoy, and E.Z. Lim)

**Leonila M. Tolentino**

University of Southern Mindanao  
Kabacan, Cotabato



**Agrotechnology Suitability Evaluation System (ASES): Development and Improvements**

(Gina Villegas-Pangga, A.J. Alcantara, C. Basilio, D.D. Manalo, and C. Mejorada)

***In Vitro* Propagation of Buho Bamboo (*Schizostachyum lumampao*)**

(Alfinetta B. Zamora and S.Sm. Gruezo)

**Isolation of Plantlets Free of Banana Bract Mosaic Virus from Infected CV Señorita**

(Alfinetta B. Zamora, C.S. Ramos and T.M. Espino)

**Major Characteristics of Philippine Traditional Upland Rice Varieties**

(Wenelle F. Petalcorin, S. Carandang, and M. A. Arraudeau)

**Development of Near-Isogenic Lines with Resistance or Tolerance Genes to Tungro Disease in Rice**

(Nonnatus S. Bautista, R. R. Yumol, R. E. Tabien, R. Ikeda and T. Imbe)

**Callus Induction and Maintenance in Chinese Cabbage (*Brassica Pekinensis* L.) CV. Corazon**

**Gina Villegas-Pangga**

Farming Systems and Soil Resources Institute  
UP Los Baños, College, Laguna,

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**Victoria PC. Lapitan**

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UP Los Baños, College, Laguna



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**Anatomical Differences Between a New CMS Source and its Maintainer Line in Rice**

(Gerard B. Magpantay, N.S. Bautista, J. R. Bongon, S. V. Siar, J. M. Villareal and T. L. Rosario)

**Molecular Mapping of 11 Isozymes and 3 Cloned Alpha-Amylase Genes In Rice (*O. Sativa* L.)**

(Gerard B. Magpantay, B. de los Reyes, D. S. Brar and N. Huang)

**Gene Transfer for Resistance to Brown Planthopper from *Oryza minuta* and Bacterial Blight from *O. Brachyantha* Into Rice (*O. Sativa* L.)**

(Ruth Elloran, R. Dalmacio, J. Flores, M. Lanuang, D. S. Brar and G. S. Khush)

**Overcoming Incompatibility in a Cross of *Oryza sativa* (L.) and *Porteresia Coarctata* (Tateoka. Roxb.)**

(Jessica P. Domingo, A. A. Barrion, R. Elloran, D. S. Brar and G. S. Khush)

**Rice Potential Production in the Philippines Using Crop Growth Model**

(Helen Grace S. Centeno, A. D. Balbarez, N. G. Fabellar, T. Horie and M. J. Kropff)

**Control of *Hirschmanniella oryzae* Using *Sesbania Rostrata* and Its Residual Effects in a Continuous Rice Cropping**

(Imelda Rizalina S. Soriano, D. M. Matias and J. C. Prot)

**Gerard B. Magpantay**

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Los Baños, Laguna



**Shoot Soluble Carbohydrate Content  
As a Measure of Daily C-Assimilation  
in Rice**

(Elizabeth A. Conocono, J. A. Egdane,  
and T. L. Setter)

**Elizabeth A. Conocono**

International Rice Research  
Institute  
Los Baños, Laguna

**New Plant Types for Irrigated Rice:  
Manipulating Panicle Height for  
Increased Light Interception**

(James A. Egdane, E. A. Conocono and  
T. L. Setter)

**James A. Egdane**

International Rice Research  
Institute  
Los Baños, Laguna

**Process of Seedling Establishment as  
Influenced by Organic Matter Application  
to Flooded Soil**

(Minoru Yamauchi and J. K. Biswas)

**Minoru Yamauchi**

International Rice Research  
Institute  
Los Baños, Laguna

**Chemical Characterization of Two Organic  
Matter Fractions in Irrigated Lowland Rice  
Soils**

(Daniel C. Oik, E. B. Belleza and K. G. Cassman)

**Daniel C. Oik**

International Rice Research  
Institute  
Los Baños, Laguna

**Relationship Between N, P and K Uptake  
and Yield in Rainfed Lowland Rice**

(Serafin T. Amarante, W. A. T. Herrera, C.  
Vejpas, D. P. Garrity and L. J. Wade)

**Serafin T. Amarante**

International Rice Research  
Institute  
Los Baños, Laguna

**Functional Equilibrium of the Rice Root  
System**

(Marianne I. Samson, C. A. Redulla, J. P.  
Descalsota and K. G. Cassman)

**Marianne I. Samson**

International Rice Research  
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Los Baños, Laguna

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**Components of Percolation Losses in Irrigated Puddled Rice Fields**

(Jovita A. Marquez, T. P. Tuong and M. C. S. Wopereis)

**Jovita A. Marquez**

International Rice Research  
Institute  
Los Baños, Laguna

**Increasing Rainfed Farmers' Income Through An Appropriate Postharvest Technique**

(Maximina A. Lantican, R. M. Lampayan, and S. I. Bhuiyan)

**Maximina A. Lantican**

International Rice Research  
Institute  
Los Baños, Laguna

**Cytogenetic Studies of Irradiated Bittergourd (*Momordica charanta* L.) and the F<sub>1</sub> BC and F<sub>2</sub> Progenies**

(Simeona V. Siar, J. R. Bongon, N. S. Bautista, J. M. Villareal, G. B. Magpantay, and T. L. Rosario)

**Simeona V. Siar**

UP Los Baños  
Laguna

**Improvement of Yield and Fiber Quality in Luffa Spp. Through Interspecific Hybridization**

(Melquiades Emmanuel C. Reyes and E. C. Altoveros)

**Melquiades Emmanuel C. Reyes**

Institute of Plant Breeding  
UP Los Baños, Laguna

**Conservation, Utilization and Propagation of Indigenous Nuts: Bago (*Diplodiscus paniculatus*), Galo (*Anacolosa luzoniensis*), Kubill (*Cubillia cubill*), and Pili (*Canarium ovatum*)**

(Rachel C. Sotto and R. E. Coronel)

**Rachel C. Sotto**

Institute of Plant Breeding  
UP Los Baños, Laguna

**Preliminary Evaluation of a Promising Papaya (*Carica papaya* L.) Hybrid**

(Violeta N. Villegas, F. B. Aurigue and R. B. Pimentel)

**Violeta N. Villegas**

Institute of Plant Breeding  
UP Los Baños, Laguna

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**Lilak, A Banana (*Musa Spp*) Selection from Tissue Culture**

(Lilian F. Pateña, R. C. Sotto, R. A. Avenido, J. G. Dimaculangan, and R. C. Barba)

**Lilian F. Pateña**

Institute of Plant Breeding  
UP Los Baños, Laguna

**Growth of Tissue-Cultured Shallot (*Allium cepa* Var Group *Aggregatum*) and Garlic (*Allium sativum* L.) Under Greenhouse Condition**

(Lilian F. Pateña, M. E. Beltran-Miranda and V. P. Chavez-Lapitan)

**Lilian F. Pateña**

Institute of Plant Breeding  
UP Los Baños, Laguna

**Cytological Investigation of Endosperm Explant and Long-Term Maintenance of Endosperm-Derived Calli of Calamansi (*X Citro Fortunella Mitis* J. Ingram and H. Moore)**

(Julita G. Dimaculangan, L. F. Pateña, R. A. Avenido and R. C. Barba)

**Julita G. Dimaculangan**

Institute of Plant Breeding  
UP Los Baños, Laguna

**Production of Seed Tubers of ASN 69.1 from Rooted Stem Cuttings, Microtubers and from Their First Generation Tubers**

(Cynthia N. Paet, A. B. Zamora, and E. C. Altoveros)

**Cynthia N. Paet**

Institute of Plant Breeding  
UP Los Baños, Laguna

**Histopathological Events During *Rhizoctonia solani* Infection in Resistant and Susceptible Corn Plants**

(Cecilia B. Pascual, A. D. Raymundo, M. Hyakumachi and M. M. Logroño)

**Cecilia B. Pascual**

Institute of Plant Breeding  
UP Los Baños, Laguna

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**Detection of Leaf Curl Virus in Pepper  
by Using Non-Radioactive DNA Probe**  
(Lolita M. Dolores and C. Pissawan)

**Lolita M. Dolores**  
Institute of Plant Breeding  
UP Los Baños, Laguna

**Towards An Integrated Linkage Map  
of Mungbean (*Vigna radiata* L. Wilczek)  
Progress and Prospects**  
(Desiree Menancio-Hautea, N. D. Young,  
L. Kumar, D. H. Kim and R. A. Hautea)

**Desiree Menancio-Hautea**  
Institute of Plant Breeding  
UP Los Baños, Laguna

**Isozymes for Genetic Mapping in  
Mungbean: Optimization of Conditions  
For Gel Electrophoresis and Identification  
of Polymorphisms**  
(Amy Emiliana N. Bernardo and D.  
Menancio-Hautea)

**Amy Emiliana N. Bernardo**  
Institute of Plant Breeding  
UP Los Baños, Laguna

**Kinetic Properties and Activity Levels of  
Ammonia and Carbon Assimilation  
Enzymes in Two *Vigna* Species**  
(Roberta N. Garcia, A. M. de la Rosa, E.  
M. T. Mendoza and D. Menancio-Hautea)

**Roberta N. Garcia**  
Institute of Plant Breeding  
UP Los Baños, Laguna

**Cytology, Morphology and Pollen  
Fertility of Interspecific Hybrids  
Between *Oryza sativa* and *O.*  
*Officinalis***  
(Violeta N. Villegas, A. A. Alfonso and T.  
H. Borromeo)

**Violeta N. Villegas**  
Institute of Plant Breeding  
UP Los Baños, Laguna

**Agronomic Evaluation of Doubled  
Haploids Derived from Rice Anther  
Culture**  
(Violeta N. Villegas, M. T. B. Peralta,  
C. C. Bato and S. Obien)

**Violeta N. Villegas**  
Institute of Plant Breeding  
UP Los Baños, College, Laguna



**Anther Culturability of Some Philippine  
Traditional Rice Varieties**

(Violeta N. Villegas and M. T. B. Peralta)

**Violeta N. Villegas**

Institute of Plant Breeding  
UP Los Baños

**Inheritance of Resistance to Rice Tungro  
Spherical Virus in Rice**

(Leodegario A. Ebron, R. Ikeda, T. Imbe, R. R.  
Yumol, N. S. Bautista and M. J. T. Yanoria)

**Leodegario A. Ebron**

International Rice Research  
Institute  
Los Baños, Laguna

**Association of p12 Protein of Rice Tungro  
Baçilliform Virus to Virions**

(Ma. Leonora M. Yambao, Z. M. Flores, F. C.  
Sta. Cruz and H. Koganezawa)

**Ma. Leonora M. Yambao**

International Rice Research  
Institute  
Los Baños, Laguna

***Oryza Glaberrima* As An Indicator Plant  
For Rice Tungro Viruses**

(Pepito O. Cabauatan, N. Kobayashi, R. Ikeda,  
and H. Koganezawa)

**Pepito O. Cabauatan**

International Rice Research  
Institute  
Los Baños, Laguna

**Direct Tissue Blotting For Detection of  
Rice Viruses**

(Gilda J. Miranda and H. Koganezawa)

**Gilda J. Miranda**

International Rice Research  
Institute  
Los Baños, Laguna

**"Red Stripe": A New Rice Disease in the  
Philippines**

(Janet F. Barroga and T. W. Mew)

**Janet F. Barroga**

International Rice Research  
Institute  
Los Baños, Laguna

**Concentrating Genes For Downy Mildew  
Resistance and Desirable Agronomic  
Traits In Corn**

(Avelino D. Raymundo and B. J. Calilung, Jr.)

**Avelino D. Raymundo**

Plant Pathology Division  
UP Los Baños, Laguna

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## HEALTH SCIENCES

**Corneal Endothelial Cell Culture in Wound Healing, Growth and Viability Studies Using Locally Available Chemicals**

(Jose David F. Marin, Jr., E. A. Abendanio, R. L. Alejo-Ramirez, and S.R. Salceda)

**Jose David F. Marin, Jr.**  
Institute of Ophthalmology  
UP PGH, Taft Avenue, Manila

**Distribution of Certain Genes Among Filipinos in Laguna C. Diabetes mellitus**  
(Rita P. Laude, R.M. Dinulos, and R.N. Tandang)

**Rita P. Laude**  
Institute of Biological Sciences  
College of Arts and Sciences

**Phytochemical Studies on the Pharmacologically-Active Compounds of *Vitex negundo* L.**  
(Fabian M. Dayrit, and L.T. Lagurin)

**Fabian M. Dayrit**  
School of Arts and Sciences  
Department of Chemistry  
Ateneo de Manila University



Republic of the Philippines  
**THE NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY**

*presents this*

## **OUTSTANDING PUBLISHED PAPER AWARDS**

*to*

**MANUELA FE H. TARROJA  
VICTOR ARNI SICAM**

"Higher-Order Correlation Functions and Correlation Dimensions of Chaotic Systems without Noise and Chaotic Systems with Noise." *NRCP Research Journal* 1(1): 50-70 (1992).

**ROY ROBERTO L. GERONA  
ERNESTO J. DEL ROSARIO**

"Facilitated Leaching of Pyrite from a Refractory Gold Ore by *Thiobacillus ferrooxidans*." *Philippine Journal of Biotechnology* 2(1): 43-59 (1991).

**FLORENTINO C. SUMERA  
NAOYA OGATA**

"Electrochemical Synthesis of Electronic and Ionic Conductive Polymer Composite Polyaniline/PEO Network" *Kimika* 9: 43-51 (1993).





**ASUNCION K. RAYMUNDO  
VIRGINIA G. CADIZ-PADRE  
SUSANA F. DE LOS SANTOS**

"Protoplast Formation, Regeneration and Fusion in *Bacillus polymyxa*." *Journal of Fermentation and Bioengineering* 71 (1220): 430-432 (1991).

**PREM NAATH MAINI  
BELEN MORALLO-REJESUS**

"Molluscicidal Activity of *Derris elliptica* (Fam. Leguminosae)." *The Philippine Journal of Science* 122 (1): 61-75 (1993).

**MA. AURORA C. TILDE  
PACIFICO C. PAYAWAL**

"Commercial Honey in the Philippines. I. Pollen Grain Analysis, II. Physical and Chemical Properties." *The Philippine Agriculturist* 75 (1 & 2): 81-87 & 89-91 (1992).

**SR. JULITA S. RUELO  
GINA TANCINCO**

"Solving the Philippine Meloidogyne Problem." *University Journal - University of San Carlos Graduate School* 10(1): 60-77 (1993).

**CLARA L. DAVIDE  
C. P. REFORMA  
I. G. SARMAGO  
L. E. SARMAGO**

"Utilization of Goat's Milk in the Local Production of Blue and Camembert-Type Cheeses." *The Philippine Agriculturist* 73(1): 11-18 (1990).



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**THE NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY**

*presents this*

**OUTSTANDING PUBLICATION AWARDS**

*to*

**MA. CYNTHIA ROSE BANZON BAUTISTA**

*In the Shadow of the Lingering Mt. Pinatubo Disaster.* Quezon City: College of Social Sciences and Philosophy, University of the Philippines and Center for Asian Studies Amsterdam, 1993.

**JEANNE FRANCES I. ILLO  
JAIME B. POLO**

*Fishers, Traders, Farmers, Wives: The Life Stories of Ten Women in a Fishing Village.* Quezon City: Institute of Philippine Culture, Ateneo de Manila University, 1990.

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## ABSTRACTS OF OUTSTANDING PUBLISHED PAPERS

**Tarroja, Manuela Fe H., and Victor Arni Sicam.** "Higher-Order Correlation Functions and Correlation Dimensions of Chaotic Systems without Noise and Chaotic System with Noise". *NRCP Research Journal* 1(1):50-70 (1992).

An aperiodic temporal behavior and the corresponding broadband power spectrum characterize chaotic systems. However, stochastic noise have similar properties and hence the above do not unambiguously identify chaos. In this paper, other properties such as the phase plots, return maps correlation dimensions, and correlation functions are used to identify signatures of chaos. A period-doubling route to chaos in a xenon laser has been identified using the time series, the power spectrum, the phase plots, and return maps and confirmed by a calculation of the correlation dimension. The effect of smoothing on the dynamical properties of the chaotic signal has also been examined. Our results suggest that at least for the type of noise associated with the detection process, smoothing can unravel fine features of chaos that are usually smeared by the presence of noise. Finally, signatures of chaos have been identified using higher-order correlation functions.

**Gerona, Roy Roberto L., and Ernesto J. del Rosario.** "Facilitated Leaching of Pyrite from a Refractory Gold Ore by *Thiobacillus ferrooxidans*". *Philippine Journal of Biotechnology* 2(1): 43-59 (1991).

This paper deals with pyrite solubilization from a refractory gold ore by the sulfur bacterium *Thiobacillus ferrooxidans*. A bacterial concentration of  $10^8$  cells/mL was effective in bioleaching; this was enhanced by aeration and  $\text{CO}_2$  supplementation. The results show the feasibility of microbial leaching for enhancing gold recovery from refractory ores.

**Sumera, Florentino C., and Naoya Ogata.** "Electrochemical Synthesis of Electronic and Ionic Conductive Polymer Composite Polyaniline/PEO Network". *Kimika* 9:43-51 (1993).

This paper reported the feasibility of constructing a bilayer of functional polymers, one acting as an electronic conducting surface, while the other, as an ionic conducting matrix. This bilayer can be useful in the fabrication of light, thin film and rechargeable plastic batteries where the polyaniline layer serves as redox surface as well as conductor plate; the PEO network serves as a solid electrolyte when soaked in salt solution and then dried. A 3.0 V initial potential was obtained when one of the electrode is a sheet of lithium metal while the

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system behaved as a rechargeable battery. One of the future uses of this kind of battery could be in conjunction with solar energy photovoltaic cells for solar energy storage purposes.

**Raymundo, Asuncion K., Virginia G. Cadiz-Padre, and Susana F. de los Santos.** "Protoplast Formation, Regeneration and Fusion in *Bacillus polymyxa*". *Journal of Fermentation and Bioengineering* 71(1220): 430-432 (1991).

The paper is the first ever report on protoplast formation, regeneration, and fusion in *Bacillus polymyxa*, an industrially important microorganism that produces the antibiotic *polymixin* which is effective against gram-negative disease-causing bacteria. The genetic studies, particularly protoplast fusion, reported in the paper are important in programs aimed at improving strains of *B. polymyxa* and increasing antibiotic yields. The results showed that protoplast fusion is possible in this organism and that consequently strain improvement can be accomplished.

**Maini, Prem Naath, and Belen Morallo-Rejesus.** "Molluscicidal Activity of *Derris elliptica* (Fam. Leguminosae)." *The Philippine Journal of Science* 122(1): 61-75 (1993).

This paper demonstrated the toxic action and effectiveness of extracts from *Derris* roots for controlling golden snail, a major pest of rice in the Philippines. For the first time, the molluscicidal action of rotenone was reported. Three other potent rotenoid principles were isolated. A rotenone free *Derris* water extract which is non toxic to fish but toxic to golden snail was obtained by thermal heating with or without soap. This extract is an environment-friendly and economical control agent for golden snail which can be prepared easily by the farmers.

**Tilde, Ma. Aurora D., and Pacifico C. Payawal.** "Commercial Honey in the Philippines. I. Pollen Grain Analysis, II. Physical and Chemical Properties". *The Philippine Agriculturist* 75(1 & 2): 81-87 & 89-91 (1992).

Bee keeping is a potentially profitable income generating project in a tropical country like the Philippines with its rich tropical vegetation of flowering plants. Furthermore, honey bees are efficient pollinating agents of crop plants that can boost productivity. But in spite of these realities, bee keeping in the country has not progressed much even though apiculture has been introduced as early as the 1930's. This is because of two major reasons, namely:

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1. The local pollen grains and nectar sources of honey bees has not been identified- informations vital to honey bee management,

2. The absence of baseline information for the formulation of national standards for honey products - control measures necessary to prevent honey adulteration and the sale of fake honey products.

These research study generated the data to fill in these information gap needed to promote bee keeping in the Philippines.

**Ruelo, Sr. Julita S., and Gina Tancinco.** "Solving the Philippine Meloidogyne Problem." *University Journal - University of San Carlos Graduate School* 10(1): 60-77 (1993).

In order to help the small farmers who do not have the time, space and funds to solve the *Meloidogyne* problem in their fields, this study aims to develop effective and economical control measures against this nematode parasite recognized as limiting factor in food and crop production reducing yield and quality of products.

**Davide, Clara L., C. P. Reforma, I. G. Sarmago, and L. E. Sarmago.** "Utilization of Goat's Milk in the Local Production of Blue and Camembert-Type Cheeses". *The Philippine Agriculturist* 73(1): 11-18 (1990).

This paper tested the gross composition of local goat's milk and established its technological suitability in Blue and Camembert cheese production. It also described the local technologies for making these mold-ripened cheeses and evaluated cheese yield, quality and consumers acceptability.

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## ABSTRACTS OF OUTSTANDING PUBLICATIONS

**Bautista, Ma. Cynthia Rose Banzon, ed.** *In the Shadow of the Lingering Mt. Pinatubo Disaster.* Quezon City: College of Social Sciences and Philosophy, University of the Philippines and Center for Asian Studies Amsterdam, 1993.

This book provides an overview of the effects of the eruption of Mt. Pinatubo on the physical, social, economic, and political landscape of Central Luzon. Focusing on the experience of Concepcion, Tarlac, it highlights the dynamics, opportunities, and problems which exist in similarly afflicted municipalities. The book embodies a seldom achieved interdisciplinary cooperation among physical and social scientists as well as the rapport established between the scientists on one hand, and the communities at risk, on the other.

**Illo, Jeanne Frances I. and Jaime B. Polo.** *Fishers, Traders, Farmers, Wives: The Life Stories of Ten Women in a Fishing Village.* Quezon City: Institute of Philippine Culture, Ateneo de Manila University, 1990.

The volume reflects the experiences of a group of women and their families with a changing environment embodied in shifting coastal resource base, fluctuations in market demand for fishery products, and developments in fishing technologies. These changes, and the effects they had on women and on their relationship with men, were mirrored in the women's life stories, resulting in layers of stories and in the interweaving of the macro with the micro, *as seen and articulated by women*. By demonstrating the dynamic relationship between technology and its users, the research points to an alternative not only of assessing technologies but also of understanding women's and men's realities in to which technology or other forces interject themselves.



Republic of the Philippines  
**THE NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY**

*presents this*

**1994 OUTSTANDING YOUNG SCIENTIST  
AWARD**

*to*

**CHERRIE L. BUNAG-PASCUAL, Ph. D.  
(Analytical Chemistry)**

In recognition of her pioneering work on the trace metal speciation of Laguna Lake.

**TERENCIO D. LACUESTA, Ph. D.  
(Physics)**

In recognition of his research work fundamental to the development of new technology utilizable in the fabrication of electronic devices.

---

**SERGIO S. CAO, Ph. D. (Mathematics)**

In recognition of his achievement in the field of integration in mathematics specifically the development of the theory of the "Henstock Integral for Banach-valued Functions".

**MARIE ANTONETTE JUINIO-MEÑEZ, Ph. D.  
(Marine Biology)**

In recognition of her multidisciplinary researches on the feeding, reproductive and larval ecology of marine invertebrates.

**CECILIA P. REYES, Ph. D. (Entomology)**

In recognition of her outstanding contributions in Entomology, particularly on the systematics of thrips (Thysanoptera), of which she is a leading authority in the Philippines.

**DESIREE I. MENANCIO HAUTEA, Ph. D.  
(Plant Genetics and Molecular Biology)**

In recognition of her outstanding contributions towards the development of the first genetic maps of mungbean and cowpea using DNA markers, her researches on species relationships in wild soybeans, and on Cercospora leaf spot disease resistance in mungbean.



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**MANUEL L. LOGROÑO, Ph. D.**  
**(Plant Breeding and Genetics)**

In recognition of his contribution to corn breeding research that led to the development of high yielding yellow corn hybrids, now part of the Grains Production Enhancement Program of the Department of Agriculture and development of the first double endosperm mutant variety approved for release by the Philippine Seed Board.

**ELDA B. ESGUERRA, Ph. D.**  
**(Postharvest Horticulture)**

In recognition of her significant contributions to postharvest physiology and handling of mango, tomatoes and onions resulting in economic benefits.

**TERESITA H. BORRAMEO, M.S.**  
**(Plant Genetics Resources  
Conservation and Management)**

In recognition of her contributions to the solution of the problems of loss of traditional and wild rice and increase public awareness in the importance of germplasm conservation.

**GIL S. JACINTO, Ph. D. (Oceanography)**

In recognition of his pioneering work in chemical oceanography particularly on nutrients and trace elements in seawater and marine sediments.



Republic of the Philippines  
**THE NATIONAL ACADEMY OF SCIENCE  
AND TECHNOLOGY**

*and*

**THE THIRD WORLD ACADEMY OF SCIENCES**

*present this*

**1994 NAST-TWAS SCIENCE PRIZE  
(BIOLOGY)**

*to*

**MARIA HELENA T. YAP, Ph. D. (Marine Biology)**

In recognition of her outstanding work in the field of marine ecosystem energy dynamics and ecology of coral reefs and sediment communities contributing to the identification of inter-regional marine environmental problems and cooperation of scientists in this field in Asia.



Republic of the Philippines  
**THE NATIONAL ACADEMY OF SCIENCE  
AND TECHNOLOGY**

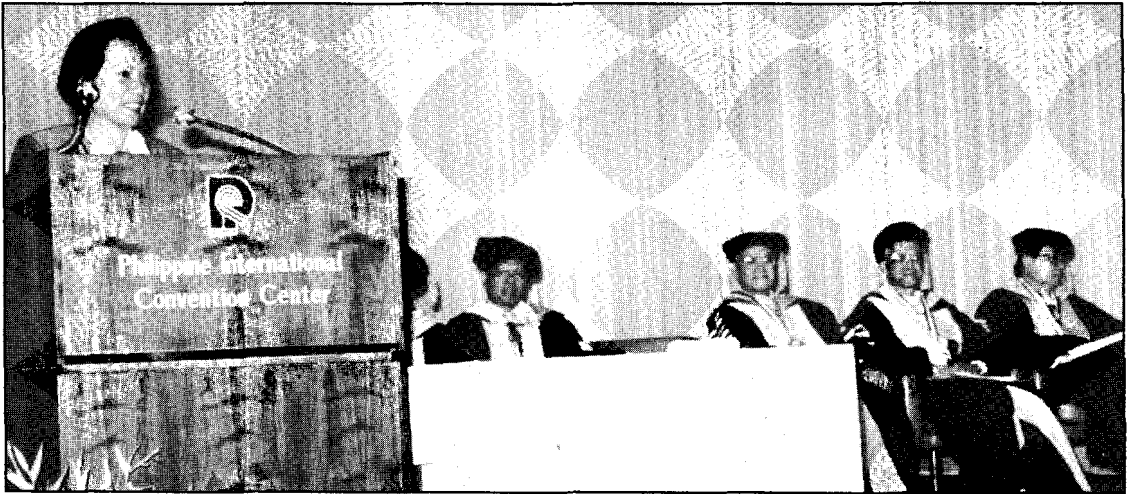
*confers the Rank and Title of*

**Academician**

*to*

**PERLA D. SANTOS-OCAMPO, M.D.  
F.P.P.S., F.A.A.P. (Hon.)  
M.D., University of the Philippines, 1955**

In recognition of her outstanding works and accomplishments in the twin scourges of diarrheal diseases and malnutrition. Her work in diarrheal diseases contributed in the elucidation of etiologic factors and planning of control measures that reinforced international recommendations in oral rehydration and nutritional management.



*Senate President Pro Tempore Leticia Ramos-Shahani in her speech before the National Academy of Science and Technology (NAST) on the occasion of its 15th Annual Scientific Meeting last July 7-8, 1993 at the PICC.*



*Senator Shahani cuts the ribbon in the opening of the poster session. (L-R) Acad. Conrado S. Dayrit, Sen. Shahani, Secretary Ricardo T. Gloria and Academician Ruben L. Villareal.*



*Secretary Ricardo T. Gloria administers the oath of office of the 4 newly elected Academicians. (L-R) Secretary Ricardo T. Gloria, Acd. Edgardo D. Gomez, Acd. Salcedo L. Eduardo, Acd. Ramon F. Abarquez, Jr. and Acd. Teodulo M. Topacio, Jr.*



*Four new members of the National Academy of Science and Technology (NAST) pose with Senator Shahani (center) and Secretary Gloria (third from left) and Acd. Conrado S. Dayrit (fifth from left).*

## ACADEMICIANS

**Year  
Elected**

1978	Paulo C. Campos, M. D.	Medicine
1978	Alfredo V. Lagmay, Ph. D.	Psychology
1978	+ Cecilio F. Lopez, Dr. Phil.	Philippine Linguistics and Oriental Studies
1978	Tito A. Mijares, Ph. D.	Statistics
1978	+ Juan S. Salcedo, Jr., M. D.	Nutrition and Public Health
1978	+ Alfredo C. Santos, Dr. Phil.	Physical Chemistry
1978	+ Dioscoro L. Umali, Ph. D.	Genetics and Plant Breeding
1978	Carmen C. Velasquez, Ph. D.	Parasitology
1978	+ Gregorio T. Velasquez, Ph. D.	Phycology
1978	+ Gregorio Y. Zara, D. Sc.	Engineering and Inventions
1979	Encarnacion Alzona, Ph. D.	History
1979	+ Teodoro A. Agoncillo, Litt. D. (h.c.)	History
1979	José Encarnacion, Jr. Ph. D.	Economics
1979	Pedro B. Escuro, Ph. D.	Genetics and Plant Breeding
1979	Raymundo A. Favila, Ph. D.	Mathematics
1979	+ Francisco M. Fronda, Ph. D.	Animal Husbandry
1979	Bienvenido O. Juliano, Ph. D.	Organic Chemistry
1979	Melecio S. Magno, Ph. D.	Physics
1979	Fe del Mundo, M. D., M. A.	Pediatrics
1979	+ Gemeniano T. de Ocampo, M. D.	Ophthalmology
1979	+ Eduardo A. Quisumbing, Ph. D.	Plant Taxonomy, Systematic and Morphology
1979	+ Jose N. Rodriguez, M. D.	Leprology
1979	+ Casimiro del Rosario, Ph. D.	Physics
1980	Luz Oliveros Belardo, Ph. D.	Pharmaceutical Chemistry and Essential Oils
1980	Magdalena C. Cantoria, Ph. D.	Botany, Pharmacognosy
1980	+ Emerita V. de Guzman, Ph. D.	Plant Physiology
1980	Conrado S. Dayrit, M. D.	Pharmacology, Cardiology
1980	+ Francisco O. Santos, Ph. D.	Agricultural Chemistry and Human Nutrition

+ *deceased*

1980	Joventino D. Soriano, Ph. D.	Cytogenetics and Mutation Research
1980	Clara Y. Lim-Sylianco, Ph. D.	Biochemistry and Organic Chemistry
1981	Clare R. Baltazar, Ph. D.	Systematic Entomology
1981	+ Julian A. Banzon, Ph. D.	Biophysical Chemistry
1981	+ Amando M. Dalisay, Ph. D.	Economics
1981	Benjamin D. Cabrera, M. D., M. P. H.	Medical Parasitology and Public Health
1982	Emil Q. Javier, Ph. D.	Genetics and Plant Breeding
1983	Gelia T. Castillo, Ph. D.	Rural Sociology
1983	Jose O. Juliano, Ph. D.	Nuclear Chemistry and Physics
1983	+ Hilario D. G. Lara, M. D., Dr. P. H.	Public Health
1983	Bienvenido F. Nebres, S.J., Ph. D.	Mathematics
1983	Faustino T. Orillo, Ph. D.	Mycology
1983	Jose R. Velasco, Ph. D.	Plant Physiology
1985	Quintin L. Kintanar, M. D., Ph. D.	Environmental Medicine
1985	Quirino O. Navarro, Ph. D.	Nuclear Chemistry
1985	+ Gregorio F. Zaide, Ph. D.	History
1987	Solita F. Camara Besa, M. D., M. S.	Biochemistry and Nutrition
1987	Filomena F. Campos, Ph. D.	Plant Breeding and Cytogenetics
1987	Lourdes J. Cruz, Ph. D.	Biochemistry and Marine Toxinology
1987	Edito G. Garcia, M. D.	Medical Parasitology
1987	Carmen Li. Intengan, Ph. D.	Nutrition
1987	Dolores A. Ramirez, Ph. D.	Biochemical Genetics and Cytogenetics
1987	Benito S. Vergara, Ph. D.	Plant Physiology
1987	Prescillano M. Zamora, Ph. D.	Plant Anatomy-morphology
1988	Ricardo M. Lantican, Ph. D.	Genetics and Plant Breeding
1990	Leopoldo S. Castillo, Ph. D.	Animal Science
1990	Apolinario D. Nazarea, Ph. D.	Biophysics
1990	Ruben L. Villareal, Ph. D.	Plant Breeding
1992	Mercedes B. Concepcion, Ph. D.	Demography
1992	Ernesto O. Domingo, M. D.	Internal Medicine
1992	Rafael D. Guerrero III, Ph. D.	Fisheries
1992	Evelyn Mae T. Mendoza, Ph. D.	Biochemistry
1993	Ramon F. Abarquez, Jr., M. D.	Cardiology
1993	Salcedo L. Eduardo, Ph. D.	Veterinary Parasitology and Systematic Helminthology
1993	Edgardo D. Gomez, Ph. D.	Marine Biology
1993	Teodulo M. Topacio, Jr., Ph. D.	Veterinary Medicine

+ *deceased*

## NATIONAL SCIENTISTS

**Year  
Conferred**

1978	+	Juan S. Salcedo, Jr. M. D.	Nutrition and Public Health
1978	+	Alfredo C. Santos, Dr. Phil.	Physical Chemistry
1978	+	Gregorio Y. Zara, Dr. Sc.	Engineering and Inventions
1980		Fe del Mundo, M. D., M. A.	Pediatrics
1980	+	Eduardo Quisumbing, Ph. D.	Plant Taxonomy, Systematics and Morphology
1982	+	Geminiano T. de Ocampo, M. D.	Ophthalmology
1982	+	Casimiro del Rosario, Ph. D.	Physics
1982	+	Gregorio T. Velasquez, Ph. D.	Phycology
1983	+	Francisco M. Fronda, Ph. D.	Animal Husbandry
1983	+	Francisco O. Santos, Ph. D.	Agricultural Chemistry and Human Nutrition
1983		Carmen C. Velasquez, Ph. D.	Parasitology
1985	+	Teodoro A. Agoncillo, Litt. D. (h. c.)	History
1985		Encarnacion Alzona, Ph. D.	History
1985	+	Hilario D. G. Lara, M. D., Dr., P. H.	Public Health
1986	+	Julian A. Banzon, Ph. D.	Biophysical Chemistry
1986	+	Dioscoro L. Umali, Ph. D.	Genetics and Plant Breeding
1987		Luz Oliveros-Belardo, Ph. D.	Pharmaceutical Chemistry
1987		José Encarnacion, Jr., Ph. D.	Economics
1988		Alfredo V. Lagmay, Ph. D.	Psychology
1989		Paulo C. Campos, M. D.	Medicine

*+ deceased*





## NAST OFFICIALS

<b>Academician Conrado S. Dayrit</b>	-	President
<b>Academician Dolores A. Ramirez</b>	-	Vice President
<b>Academician Jose O. Juliano</b>	-	Secretary
<b>Academician Filomena F. Campos</b>	-	Member
<b>National Scientist José Encarnación, Jr.</b>	-	Member
<b>National Scientist Alfredo V. Lagmay</b>	-	Member
<b>Academician Faustino T. Orillo</b>	-	Member

## ANNUAL SCIENTIFIC MEETING PROGRAM COMMITTEE

<b>Academician Jose O. Juliano</b>	-	Chair
<b>Academician Dolores A. Ramirez</b>	-	Co-Chair
<b>Academician Melecio S. Magno</b>	-	Member
<b>Academician Magdalena C. Cantoria</b>	-	Member
<b>Academician Ernesto O. Domingo</b>	-	Member
<b>Academician Gelia T. Castillo</b>	-	Member
<b>Academician Mercedes B. Concepcion</b>	-	Member
<b>Academician Ramon F. Abarquez, Jr.</b>	-	Member
<b>Academician Edgardo D. Gomez</b>	-	Member
<b>Academician Teodulo M. Topacio, Jr.</b>	-	Member

## SECRETARIAT

<b>Miss Luningning E. Samarita</b>	-	Acting Executive Director
<b>Miss Rosemarie S. Espino</b>	-	Administrative Officer V
<b>Mrs. Rowena V. Briones</b>	-	Information Officer II
<b>Miss Chona C. Sollestre</b>	-	Cashier III
<b>Mr. Eliseo D. Raganit</b>	-	Utilityman
<b>Mr. Roberto N. Medina</b>	-	Driver