Annual Convention of the Association of Systematic Biologists of the Philippines

(SEC Reg. Association of Philippine Taxonomists, Inc.)

Theme:

"Philippine Systematics Beyond Borders"

19 - 20 May 2016
University of Santo Tomas
Espana, Manila

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Association of Systematic Biologists of the Philippines

(SEC Reg. Association of Philippine Taxonomists, Inc.)

Established in 1982, the Association of Systematic Biologists of the Philippines (ASBP) aims to promote and represent the science and practice of taxonomy, systematics and natural history in the county. Initially formed by a core group of Filipino biologists and researchers based in the National Museum, its membership has grown to encompass professionals, students and enthusiasts all over the Philippines and abroad. Its scope has expanded in recent years outside of the traditional sphere of basic taxonomy and systematics to include ethnobiology, biodiversity conservation and public education. Membership in the ASBP is open to all who subscribe to the goals of the organization.

Association of Systematic Biologists of the Philippines

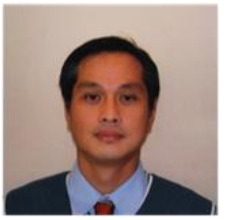
(SEC Reg. Association of Philippine Taxonomists, Inc.)

OFFICERS (2014—2016)

Grecebio Jonathan D. Alejandro, Dr. rer.nat.
President

Lawrence Liao, Ph.D.
Vice President

Florfe Acma, Ph.D.
Secretary



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Luisito Evangelista, Ph.D.
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The Royal, Pontifical and Catholic **University of Santo Tomas** (UST) is proud to host the 2016 ASBP Annual Meeting and Symposium. The host institution holds the distinction of being Asia's oldest existing university, its age is coupled with its preeminence in Philippine education. Not only does it boast of several firsts in the different realms of education, it also has administrators and faculty members who are holding leadership positions in the Philippines' policy-making bodies (e.g. Commission on Higher Education) and professional organizations, helping influence policies for the betterment of the society in general.

University of Santo Tomas
OFFICE OF THE RECTOR

Association of Systematic Biologists of the Philippines (ASBP) Symposium

Scientists are aware of the fact that innovations and breakthroughs are paramount issues because scientific inquiry involves performing experiments and engaging in various forms of research which require scientists to have a firm grasp of new knowledge. One exciting field in the sciences is Biological Systematics which involves the study of the diversification of living forms and their relationships with other living things through time. This area of science likewise involves the study organisms that have existed both in the past and in the present. This branch of science is very important because it provides scientific names for organisms as well as describes and classifies them. Without systematic biology, it would be difficult and probably almost impossible to create a higher taxonomy or even trace their evolutionary histories.

On May 19-20, the Association of Systematic Biologists of the Philippines (ASBP) in cooperation with the UST Graduate School will be holding the 2016 Symposium and Annual Membership at the Thomas Aquinas Research Center (TARC) Auditorium. Aptly-themed ***Philippine Systematics Beyond Borders***, this year's symposium will engage participants, both local and international, to delve into the conventions and intricacies of theories and applications as well as the implications and impact of Systematic Biology in the 21st century. We are happy that the symposium and the annual membership meeting of the ASBP will be held at the University of Santo Tomas, which is also the home of many national and international conferences and conventions. We extend our warmest congratulations to the organizers and participants for the resounding success of this year's symposium.

FR. RICHARD G. ANG, O.P.
Acting Rector

The Graduate School
University of Santo Tomas

ASSOCIATION OF SYSTEMATIC BIOLOGISTS OF THE PHILIPPINES

In gatherings relating to scientific discoveries and research, “beyond borders” makes for a most appropriate theme under a fast changing environment. Indeed, when one thinks “out of the box,” there can be no limit or scope within one’s ability to generate new ideas.

But what does it take when one thinks beyond borders?

Foremost is the importance of assessing the current situation of crucial note. While one becomes concerned with the problems that the present condition brings and then thinks of solutions, he also becomes proactive by being able to forecast similar or new situations that are bound to occur.

By envisioning what else could possibly happen, one is able to help others do things by re-directing their path. By being proactive, one becomes an agent of change and leads uniquely by formulating solutions that are appropriate and viable. In this fast-paced world characterized by diverse perspectives, it is crucial that one is able to listen and share the vision of these diverse groups and work towards unifying them.

The Association of Systematic Biologists of the Philippines, in cooperation with the UST Graduate School, has come up with a timely undertaking that assembles in one gathering an elite society of biologists in the country. Aptly themed “Philippine Systematics Beyond Borders,” the conference revolves around the point that the biological diversity confronting us today creates an important reason for us to collectively address crucial issues and provide proactive solutions while time is on our side.

It is on this note that I would like to congratulate the *Association of Systematic Biologists of the Philippines* (ASBP) on this significant project of holding the 2016 Symposium and Annual Meeting. May you continue to leave an indelible mark on the minds of those who desire for enlightenment especially on pressing issues that pertain to the future of humankind.

Prof. Marilu Rañosa-Madrunio, PhD.
Dean, The Graduate School

Association of Systematic Biologists of the Philippines
(SEC Reg. Association of Philippine Taxonomists, Inc.)

It is a great pleasure for me to greet and welcome everybody in the **2016 Symposium and Annual Membership Meeting of the Association of Systematic Biologists of the Philippines**. It has been 34 years ago when ASBP was formally formed by a group of 15 Filipino taxonomists and systematists whose primary aim was to promote this seemingly neglected yet a very important field of science. Some of the charter members are still active and doing research even today and luckily are here with us in this meeting. It is indeed a privilege and honor to be the first president of ASBP and I have witnessed with pleasant memories the evolution and development of this organization as one of the elite professional organization looked up to by colleagues in science. From a core group of 15 charter members in 1983, ASBP continued to grow through the years and today the membership has risen to more than 200 active members. These are grouped into: honorary, regular, associate, hobbyists, foreign, institutional members.

In its effort to promote the field of systematics in the country ASBP has been involved in various projects and events. Among these are: holding annual meetings focused on various themes such as the role of systematics in the promotion of biodiversity conservation and environmental protection, the history of plant and animal taxonomic research in the country, the history and role of botanic gardens in the Philippines, etc. It also gives recognition and awards both to professional s and outstanding students in the discipline. The present theme: ***"Philippine Systematics Beyond Borders"*** is most appropriate and relevant to us in the scientific and academic communities as it highlights the importance of taxonomy and systematic not only in providing the basic knowledge on the diversity of plants and animals but also its application in the more applied fields of human endeavour such as in agriculture, forestry, management and conservation of aquatic and terrestrial environment, its role in alleviating or mitigating the harmful effects of climate change, and many other aspects.

I am also proud to inform that the ASBP is one of the few professional organization in the Philippines that publishes a scientific journal dedicated to the discipline. i.e. the **Philippine Journal of Systematic Biology**. From its precursor publication, the **ASBP Communications** in 1984, the PJSB has now come out with 9 volumes published annually from 2007 to 2015. From the traditional printed volumes, **PJSB** is now available on-line and soon will be incorporated in the ASBP website planned for this year. It is included in the Thomson-Reuters Master List of Journals and various indexing journals. The high standard of PJSB is attributed to the commendable efforts of its Board of Editors and Editorial Staff.

In closing, I wish everyone a successful and enjoyable 2-day meeting and symposium. This would not have happened if not for the commendable efforts of the present set of officers and committee members of the association headed by Dr. Grecebio Jonathan Alejandro, to which I extend my sincere thanks and appreciation.

DOMINGO A. MADULID, Ph.D.
First President, ASBP

Association of Systematic Biologists of the Philippines
(SEC Reg. Association of Philippine Taxonomists, Inc.)

On behalf of the Association of Systematic Biologists of the Philippines (ASBP), Sec. Reg. Association of Philippine Taxonomists, Inc. (APTI), I am privileged to welcome everyone to our 2016 Annual Symposium and Annual Membership meeting.

This year's theme ***'Philippine Systematics Beyond Borders"*** aims to tackle how to unfold the science behind Systematic Biology from its conventional theories and applications, and the traditional constraints it is facing in the 21st century. Furthermore, this event attempts to explore possibilities on how the field can touch all aspects of human endeavors, and promote solidarity among Systematists. This is a gathering of systematic biologists and biodiversity enthusiasts from all over the Philippines including participants from foreign countries who share their ideas and research findings on Philippine and/or Asian biodiversity.

Let us make 2016 ASBP a meaningful meeting by reflecting on its theme and participating in lectures, poster, YSBF, and workshops. Please accept my deepest gratitude to all the members of the national and local organizing committees particularly the Graduate School, University of Santo Tomas, for bringing the 2016 ASBP to fruition.

GRECEBIO JONATHAN D. ALEJANDRO, Dr.rer.nat.
President, ASBP (APTI)
University of Santo Tomas

Program Overview

Day 1 May 19, 2016	
7:00 AM	Registration
8:30 AM	Opening Ceremonies
9:30 AM	Opening of Poster Exhibits and Group Photo
10:00 AM	Snacks
10:30 AM	Plenary Lecture 1 Plenary Lecture 2
12:00 NN	Lunch and Viewing of Poster Exhibits
1:00 PM	Parallel Lecture A Parallel Lecture B
2:15 PM	Snacks
2:30 PM	Parallel Lecture C Parallel Lecture D
3:45 PM	Business Meeting and Election of Officers
5:30 PM	Welcome Dinner

Day 2 May 20, 2016	
7:30 AM	Registration
8:00 AM	Plenary Lecture 3 Plenary Lecture 4
9:30 AM	Snacks
9:45 AM	YSBF—Undergraduate Category
11:00 AM	YSBF—Graduate Category
12:15 NN	Lunch and Viewing of Poster Exhibits
1:30 PM	Workshops 1 Workshops 2 Workshops 3
2:30 PM	Snacks
2:45 PM	Closing Ceremonies Announcement of Winners Distribution of Certificates

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Scientific Program
Day 1: 19 May 2016 (Thursday)

(TARC Auditorium)

7:00 – 8:30 AM	:	REGISTRATION (TARC LOBBY)
8:30 – 9:30 AM	:	OPENING CEREMONIES
Invocation	:	College of Science Glee Club
National Anthem	:	College of Science Glee Club
Opening Remarks	:	Dr. Grecebio Jonathan D. Alejandro President, ASBP
Welcome Address	:	Prof. Marilu R. Madrunio, PhD. Dean, The Graduate School University of Santo Tomas
Intermission number	:	College of Science Glee Club
Introduction of Keynote Speaker	:	Dr. Juan Carlos T. Gonzales
Keynote Address	:	Dr. Irineo Lit Professor, Entomology Section Museum of Natural History, UPLB
9:30 – 10:00 AM	:	OPENING OF POSTER EXHIBITS AND GROUP PHOTO (TARC Lobby)
10:00 – 10:30 AM	:	SNACKS (SWR Rm. 201-205, TARC)
Emcee	:	Mr. Jayson G. Chavez, Msc.

10:30 – 11:00 AM	:	Introduction to Plenary Speaker 1 Dr. Lawrence M. Liao PLENARY LECTURE 1 Dr. Masahiro Ohara
11:00 – 11:30 AM	:	Introduction to Plenary Speaker 2 Dr. Florfe M. Acma PLENARY LECTURE 2 Dr. Edwino Fernando
11:30 – 12:00 AM	:	OPEN FORUM Moderator: Dr. Cecilia I. Banag
12:00 – 1:00 PM	:	Lunch (SWR Rm. 201—2015) and Viewing of Poster Exhibit (TARC Lobby)
1:00 – 2:15 PM	:	PARALLEL LECTURE A Venue: TARC Auditorium Moderator: Dr. Axel H. Arriola PARALLEL LECTURE B Venue: TARC Rm. 400 Moderator: Dr. Jonathan Carlo Briones
2:15 – 2:30 PM	:	Snacks
2:30 – 3:45 PM	:	PARALLEL LECTURE C Venue: TARC Auditorium Moderator: Dr. Richard Thomas B. Pavia, Jr. PARALLEL LECTURE D Venue: TARC Rm. 400 Moderator: A/Prof. Sonia N. Javier
3:45 – 5:00 PM	:	Business Meeting and Election of Officers TARC AUditorium
5:30 – 8:30 PM	:	WELCOME DINNER Venue: TARC SWR Rm. 201 – 205

Scientific Program

Day 2: 20 May 2016 (Friday)

(TARC Auditorium)

7:30 – 8:00 AM	:	REGISTRATION
8:00 – 8:30 AM	:	Introduction to Plenary Speaker 3 Dr. Rey Donne S. Papa PLENARY LECTURE 3 Dr. Roberto Pagulayan
8:30 – 9:00 AM	:	Introduction to Plenary Speaker 4 Dr. Edwin Tadiosa PLENARY LECTURE 4 Dr. Spencer Benson
9:00 – 9:30 AM	:	OPEN FORUM Moderator: Dr. Gina Dedeles
9:30 – 9:45 AM	:	Snack (Board Rm, 3rd fl., TARC)
9:45 – 11:00 AM	:	YOUNG SYSTEMATIC BIOLOGIST FORUM UNDERGRADUATE LEVEL Moderator : Dr. Lawrence C. Liao
11:00 – 12:15 PM	:	YOUNG SYSTEMATIC BIOLOGIST FORUM GRADUATE LEVEL Moderator: Dr. Lawrence C. Liao
12:15 – 1:30 PM	:	LUNCH AND VIEWING OF POSTERS
1:30 – 2:30 PM	:	WORKSHOP SESSION 1 Venue: TARC Auditorium WORKSHOP SESSION 2 Venue: TARC Room 400 WORKSHOP SESSION 3 Venue: TARC Room 408
2:30 – 2:45	:	Snack Board Rm, 3rd fl., TARC
2:45 – 3:30	:	CLOSING CEREMONIES Announcement of Winners Distribution of Certificates
Emcee	:	Mr. Jayson Chavez, MSc.

ASBP 2016 Steering Committee

Convention Chair
Dr. Grecebio Jonathan D. Alejandro

Local Organizing Committee Chairs
Dr. Rey Donne S. Papa
Dr. Cecilia I. Banag

Scientific Program
Dr. Grecebio Jonathan D. Alejandro
Mr. Jayson Chavez

Souvenir Program
Dr. Axel H. Arriola

Secretariat, Registration & Membership
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Ms. Hao Wei Hsu
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Ms. Nica M. Garcia

Scientific Lectures
Dr. Cecilia I. Banag
Mr. Rudolph Docot
Mr. Jorge Ordas

Poster & Workshop Sessions
Dr. Rey Donne S. Papa
Ms. Hazel Ann Guerrero

ASBP 2016 Steering Committee

YSBF
Dr. Lawrence C. Liao

Certificate, Awards & Souvenir
Dr. Juan Carlos Gonzalez
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Fellowship
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Physical Arrangement
Dr. Jonathan Carlo Briones
Ms. Sonia N. Javier
Mr. Josefino Castillo

Reception
Dr. Richard Thomas B. Pavia, Jr.
Ms. Anna Christina Ngo

Food Committee
Mrs. Mae Lowe Diesmos
Ms. Maureen Sabit

COMELEC
Dr. Roberto Pagulayan
Dr. Edwin Tadiosa

Keynote Lecture
On the Theme

"Philippine Systematics Beyond Borders"

Prof. Ireneo L. Lit, Jr PhD.

Dr. Ireneo L. Lit, Jr is Professor 1 at the Environmental Biology Division, Institute of Biological Sciences, College of Arts and Sciences, UPLB and concurrently the Director of the UPLB Museum of Natural History. Ireneo or "Jun" gained his PhD and MS degrees in Systematic Entomology and his BS Agriculture (Major in Entomology) from the University of the Philippines Los Banos. Jun was a Honorary Visiting Postgraduate Research Fellow in Ecology, Evolution and Systematic at the Australian National University from 1994-1997.At UPLB, he teaches graduate and undergraduate courses in Ecology, Environmental Biology, Environmental Management, Evolutionary Biology, Conservation Biology in the Tropics, Entomology, Systematics, Cave Ecology, Scientific Writing, Natural Science – The Living Planet (A General Education Course covering aspects of Astronomy, Geology and Biology). Jun' research interests fall under Arthropod Systematics (scale insects including mealybugs, stick insects, ants, soil and cave arthropods, butterflies), Terrestrial Arthropod Biodiversity especially Soil and Cave Biodiversity, Ecology of mutualisms especially those involving ants and of host plant-arthropod herbivore interactions, insects on bamboos and on endangered plants and biosafety of insect-protected biotech hybrids to non-target organisms He is a Curator of Mealybugs and other Scale Insects (Coccoidea) in the Entomology Section of the UPLB MNH; Affiliate Professor in the Crop Protection Cluster (College of Agriculture), Department of Forest Biological Sciences (College of Forestry and Natural Resources) and School of Environmental Science and Management.

Plenary Lectures

Plenary Lecture 1

Promoting Parataxonomists Training Course in Japan

Masahiro Ôhara

The Hokkaido University Museum (HoUM), Hokkaido University
North 10, West 8, Sapporo, 060-0810 Japan
Email: ohara@museum.hokudai.ac.jp

The population of Japanese entomological taxonomists (ET) is currently endangered. Over the last ten years, ten ET laboratories have closed. Only four ET laboratories in Japan will be operational in the future as there is presently more than one taxonomist staff in each of these laboratories. Since 2004, we started to deliver training courses on "parataxonomist" (PTTC) for students and the public. It is important that social movements understand the meaning of taxonomy and biodiversity. Graduates of the PTTC learn to appreciate the importance of keeping ET laboratories in both universities and museum collections. HoUM is an important organization for ET as it trains taxonomists and parataxonomists, maintains a valuable museum collection, but faces challenges as it has very few staff and a small budget for the University museum. I shall introduce our experience of PTTC, not only of ET but also of other taxonomy of biology, geology and archaeology in Japan.

Masahiro ÔHARA, Ph.D. is an entomologist and taxonomist of the family Histeridae, Coleoptera. He is the Vice Director and Professor of The Hokkaido University Museum, Sapporo, Japan, and also Professor of Graduate School of Agriculture, Hokkaido University. For the last five years, he was Chief Editor of *Elytra, New Series* (the Journal of the Coleopterological Society of Japan). He holds a bachelor's degree in biology from Kagoshima University as well as masters and doctoral degrees in agriculture, major in entomology from Hokkaido University.

Plenary Lecture 2

Making taxonomic information useful for biodiversity conservation

Edwino S. Fernando

Department of Forest Biological Sciences, College of Forestry and Natural Resources, and The Forestry Herbarium, Museum of Natural History, The University of the Philippines – Los Baños, 4031 Laguna, Philippines

Incomplete knowledge of taxa and and the general lack of taxonomists has been put forward by the Convention on Biological Diversity (CBD) as a 'taxonomic impediment' to its implementation. The impediment, however, can also refer to taxonomy itself, *e.g.* insufficient funding for basic research, the regulatory maze associated with collecting biological samples, the low citation rates of taxonomic papers, or the scattered nature of taxonomic information. The latter is significant in that it leads to complicated information that only very few non-specialists can engage directly with the primary taxonomic literature. Yet, taxonomic information is essential for addressing many critical issues of biodiversity and its conservation. Making this information accessible will require, *inter alia,* a change in media from very formal taxonomic papers to user-friendly and interactive web pages, to illustrated, colourful, and concise field guides. Providing the public, *i.e.* our taxonomy end-users and stakeholders, easy access to processed taxonomic information can help encourage greater involvement in biodiversity conservation.

Dr. Edwino S. Fernando is MNH's curator for Palms and other Forest Plants. He is currently Professor 12 at the Department of Forest Biological Sciences, College of Forestry and Natural Resources, University of the Philippines Los Baños. He earned his PhD Botany (1994) from the University of New South Wales (Australia); MSc Plant Taxonomy (1981) from the University of Reading (England); MSc Forestry (major in Forest Botany) (1980) and BS Forestry (major in Forest Biological Sciences) (1975) from the University of the Philippines Los Baños.

Plenary Lecture 3

"Intellectual Property Considerations in Biodiversity Research"

Roberto .C. Pagulayan

Angeles University Foundation
Angeles City, Philippines

Generation of new knowledge through research is a major function of a university. In recent years, such research outputs have been increasingly regarded as intellectual capital - intangible assets that can be leverage for its economic value. A university can drive economic and social development by producing new ideas, knowledge, and innovations, from all areas of academic research activities – biodiversity and taxonomy included. Our biotic resources are repositories of largely untapped knowledge that historically have been put to use by our "herbolaryos". Sadly, though, we have heard of stories where foreign pharmaceutical companies have exploited such indigenous knowledge to their profit. Indeed, the spur of natural products researches in the academe, supported by our government, is academically good, but also naturally exposed to exploitation that is dis-advantageous to our country. There is a need to protect intellectual property coming from these research works. There is a need for researchers to be cognizant of the need to consider intellectual property in their research design.

This paper presents a bird's eye-view of the Intellectual Property landscape in the Philippines and the extent to which it is infused in academic research. It will: 1) explore the relevant laws and regulations pertaining to Intellectual property rights, especially those that are relevant for researchers in the field of taxonomy, biodiversity, and ecology. 2) advocate a re-examination of current practice in doing research – in theses, dissertations, or faculty/staff research projects – especially where a potential IP output is expected.

Prof. Dr. RC Pagulayan has authored and co-authored 21 scientific articles and 2 books. He was trained in Intellectual Property by the Philippine Intellectual Property Office in 2011 and in the same year passed the European Patent Office Qualifying Examination for Patent Agents. He is a registered Patent Agent of IPO Philippines and is the Manager of the AUF-IPOPhol Innovation and Technology Support Office or ITSO. He has also rendered, and continues to do, numerous research, consultancy, and extension services to various government and non-government organizations.

Plenary Lecture 4

21st Century Microbial Systematics: Research and Education Perspectives

Spencer A. Benson

Centre for Teaching and Learning Enhancement and Faculty of Health Sciences

The technological developments of recent decades have reshaped how we approach biological research and higher education in profound and unforeseen ways. In this talk we will focus on the impacts of technology advances, affects on old and new questions and the challenges doing systematic research in the modern era. In addition, the presentation will touch upon how these advances raise new challenges with respect to undergraduate and graduate teaching and learning.

Prof. Spencer Benson, Director, Centre for Teaching and Learning Enhancement, and Professor in the Faculty of Health Sciences at the University of Macau SAR, PRC. Prof. Benson received his B.S. in Zoology from the University of Vermont and his Ph.D. in Genetics from the University of Chicago. He is the 2002 US CASE-Carnegie Maryland Professor of the Year and recipient of the 2011 American Society for Microbiology Carski Teaching Award. He is the chair of the American Society for Microbiology International Education Committee and in 2008-09 was a Fulbright Fellow to Hong Kong working on general education.

Parallel Lectures

Lists of Parallel Lectures

PARALLEL SESSION A Venue: TARC Auditorium Moderator: Dr. Axel H. Arriola	
1:00 – 1:15	Recent Taxonomic Notes and New Distribution Localities of *Podocarpus* species in the Philippines Florence Roy P. Salvaña and William Sm. Gruezo
1:15 – 1:30	Taxonomy of Edible Juvenile Bamboo Shoots in the Philippines Analeah L. Ricohermoso, Annalee S. Hadsall, Merdelyn T. Caasi-Lit
1:30 – 1:45	Molecular phylogeny and barcoding of selected Philippine Vanguerieae (Rubiaceae), including two new species, a combination, and an antimicrobial study of *Psydrax puberula* Mariane Paula C. Agoncillo, Emil Joshua C. Cano, Beatrice Camille G. Del Rosario, Axel H. Arriola and Grecebio Jonathan D. Alejandro
1:45 – 2:00	Carbon Dioxide Sequestration Properties of Forest Trees in Mount Kitanglad Range Natural Park Lynnette A. Ejem, Marites M. Egar, Joy M. Mirasol, Zita I. Dales

PARALLEL SESSION B Venue: TARC Room 400 Moderator: Dr. Jonathan Carlo Briones	
1:00 – 1:15	Filling in the gaps: using biogeographic patterns in finding new species Juan Carlos T. Gonzalez
1:15 – 1:30	Taxonomy of Two Endemic Philippine Calanoid Copepods: *Pseudodiaptomus brehmi* Kiefer, 1938 and *Diaptomus vexillifer* Brehm, 1933 Shea Kathleen P. Guinto and Rey Donne S. Papa
1:30 – 1:45	Detection of *Crocodylus mindorensis* x *Crocodylus porosus* (Crocodylidae) hybrids in a Philippine crocodile systematics analysis John Aries G. Tabora, Ma. Rheyda P. Hinlo, Carolyn A. Bailey, Runhua Lei, Cayetano C. Pomares, Glenn Rebong, Merlijn van Weerd, Shannon E. Engberg, Rick A. Brenneman & Edward E. Louis, jr.
1:45 – 2:00	Preliminary Survey of Frog Species in Baguio-Benguet Area and Detection of Fungal Symbionts using Standard PCR Assay Camille Andrea Flores, Arthien Lovell Pelingen*, Axel John Briz, Roland Hipol, Celia Austria
2:00 – 2:15	Understanding rice root-knot nematode *Meloidogyne graminicola* populations in the Philippines: life cycle and characterization Ma. Teodora Nadong Cabasan

Lists of Parallel Lectures

PARALLEL SESSION C Venue: TARC Auditorium Moderator: Dr. Richard Thomas B. Pavia, Jr.	
2:30 – 2:45	Isolation, Characterization and Identification of Endophytic Fungi from the Roots of *Avicennia sp.* at Las Piñas-Paranaque Critical Habitat and Ecotourism Area Ace Bryan S. Cabal, MSc and Joshua Mark P. Nombre
2:45 – 3:00	Isolation, Characterization and Identification of Fungal Endophytes from the Leaves of the Mangrove *Avicennia* sp. Ace Bryan Cabal and Camille Anne Duzon
3:00 – 3:15	Macroscopic Fungi at Quezon Protected Landscape, Southern Luzon, Philippines Minerva Capon-Arenas, Edwin R. Tadiosa, Grecebio Jonathan D. Alejandro and Renato G. Reyes.
3:15 – 3:30	Two Frequently Confused Genera of the Marine Red Algal Flora of the Philippines: *Claudea* Lamouroux and *Zellera* G. Martens (Rhodophyta: Delesseriaceae) Lawrence M. Liao, Luisito T. Evangelista, Ivan Patrick B. Tualla and Paul John L. Geraldino
3:30 – 3:45	Polyphasic Taxonomy in the Marine Bioluminescent Bacteria and the Proposition of *Vibrio philippinensis* sp. nov. for the bioluminescent *Vibrio parahaemolyticus*-liked Bacterium Isolated From *Penaeus monodon* (Black Tiger Shrimp) Coleto, Ma. Rosalina M., Gardoce, Joselito A., Gonzales, Marvin J., Ibarra, Ma. Therese V., Pereda, Jacqueline R., Thomas Edison dela Cruz and Edward A. Quinto

PARALLEL SESSION D Venue: TARC Room 400 Moderator: A/Prof. Sonia N. Javier	
2:30 – 2:45	Diversity Assessment of Edible Bivalves in the Inter tidal Zone in Pilar Bay Philomel Innocent P. Obligar
2:45 – 3:00	Species Level Assessment of Freshwater Crabs in Mindoro with Special Reference to Baroc River Catchment, Roxas, Oriental Mindoro Alfredo P. Carpio Jr.
3:00 – 3:15	Cockroaches: from Condemnation to Conservation Cristian C. Lucañas
3:15 – 3:30	Forest Spiders as Important Bioressource in Keeping Pest Populations in Check Aimee Lynn A. Barrion-Dupo
3:30 – 3:45	Diversity and Status of Butterflies in Mt. Sipaka, Talisayan Misamis Oriental Robert T. Llemit[1] and Joliesa Mae S. Toledo[2]

Recent Taxonomic Notes and New Distribution Localities of *Podocarpus* species in the Philippines

Florence Roy P. Salvaña[1] and William Sm. Gruezo[2]

[1]Department of Biological Sciences, College of Arts and Sciences, University of Southern Mindanao, Kabacan, Cotabato rdsalvana@usm.edu.ph
[2]Plant Biology Division, Institute of Biological Sciences, College of Arts and Sciences, University of the Philippines Los Baños, College, Laguna asialifesciences@yahoo.com

Taxonomy of plants provides a great contribution to understanding diversity and conservation. This study aimed to investigate some confusing characteristics of *Podocarpus*species in the Philippines and determine new distribution localities of these species. Notable results of this study are: (1) the existence of variable leaf forms in *Podocarpuspilgeri*is correlated to the type of habitat where this species occurs; (2) variable leaf forms and sizes are observed in mature and juvenile leaves of all species; (3) *P. palawanensis*is considered a distinct species in the Philippines and is treated under Section Macrostachyus de Laub.; (4) differences between the wild and cultivated representatives of *P. costalis* are recognized based on leaf characters; (5) new distribution areas of *P. ramosii, P. pilgeri, P. costalis, P. neriifolius, P. rumphii*and *P. polystachyus*are recorded; and (5) a comprehensive examination of numerous herbarium and recently collected specimens results to the correct identification of many specimens accordingly.

Taxonomy of Edible Juvenile Bamboo Shoots in the Philippines

Analeah L. Ricohermoso[1*], Annalee S. Hadsall[2], Merdelyn T. Caasi-Lit[3]

[1]BS Biology (Undergraduate Student), Plant Biology Division (PBD), Institute of Biological Sciences, College of Arts and Sciences, University of the Philippines, Los Baños (UPLB), 4031 College, Laguna, Philippines,
*alricohermoso@up.edu.ph;
[2]Assistant Professor, Institute of Biological Sciences, College of Arts and Sciences, UPLB and Curator, Botanical Herbarium (CAHUP), Museum of Natural History, UPLB;
[3]Institute of Plant Breeding (IPB), Crop Science Cluster, College of Agriculture, UPLB, 4031 College, Laguna, Philippines

Morphological characterization of nine commonly consumed bamboo species namely *Bambusa blumeana* J.A. & J.H. Schultes, *Bambusa merrilliana* (Elmer) Rojo & Roxas *comb. nov.*, *Bambusa philippinensis* (Gamble) McClure, *Bambusa vulgaris* Schrad. ex Wendl., *Bambusa vulgaris* Schrad. ex Wendl. cv. *vittata* McClure, *Dendrocalamus asper* (Schultes f.) Backer ex Heyne, *Dendroclamus latiflorus* Munro, *Gigantochloa atter* (Hassk.) Kurz and *Gigantochloa levis* (Blanco) Merrill was done. Thirty-one characters (24 qualitative and 7 quantitative) were used for phenetics and cluster analysis using PAST ver. 2.17c Dichotomous key was also constructed. This study claims that characterization of juvenile shoots could be source of taxonomic evidence and thus helpful in bamboo identification.

Molecular phylogeny and barcoding of selected Philippine Vanguerieae (Rubiaceae), including two new species, a combination, and an antimicrobial study of *Psydrax puberula*

Mariane Paula C. Agoncillo[1], Emil Joshua C. Cano[1], Beatrice Camille G. Del Rosario[1], Axel H. Arriola[2] and Grecebio Jonathan D. Alejandro[1,2,3]

[1]Department of Biological Sciences, College of Science, [2]The Graduate School and [3]Research Center for the Natural and Applied Sciences, University of Santo Tomas, España, Manila 1015, Philippines E-mail: beatricedelrosario@yahoo.com

The availability of molecular data in plants has provided more robust phylogenies, better resolution of major lineages, and ideal barcode for species identification within a particular group. In this study, molecular data was utilized in the phylogeny and authentication of the selected Philippine Vanguerieae (Rubiaceae). Recent molecular study of Vanguerieae by Razafimandimbison et al. (2009) revealed the polyphyly of the genus *Canthium*Lam.Subsequently, the genus was restricted to include species possessing spines causing the transfer of several species to other genera. In response to the new concept of *Canthium*, five of the 20 Philippine species were transferred already to either *Psydrax* or *Pyrostria*(Alejandro et al., 2013 & 2014). This continuing study, which involves molecular sequence data proposes a new combination [*Pyrostriaelliptica* (Merr.) Del Rosario, Arriola and Alejandro] and two new species (*Pyrostriacuspidata*Agoncillo, Arriola and Alejandro; *Pyrostrialuzonensis* Cano, Arriola and Alejandro), and an assessment through barcoding analysis that ITS is a good barcode for the Philippine Vanguerieae. Lastly, the Philippine endemic *Psydraxpuberula*is a promising source of bioactive compounds due to the bactericidal activities against microbial organisms.

Carbon Dioxide Sequestration Properties of Forest Trees in Mount Kitanglad Range Natural Park

Lynnette A. Ejem, Marites M. Egar, Joy M. Mirasol, Zita I. Dales
Bukidnon State University
marites_egar@yahoo.com

Tropical forests are important sources and sinks of carbon (C). However, there is limited information on the ability of tropical forests to store and sequester C. The study aimed to quantify the C stocks of tree species in selected sites of Mount Kitanglad Range Natural Park (MKRNP); determine species diversity of trees in the study sites of MKRNP, Bukidnon, Philippines. Results show that the trees in the upper montane of Mt. Kitanglad have more carbon stocks amounting to an average of 439.49 ton/ha. In the study sites of mid-montane the carbon stocks amounted to

Isolation, Characterization and Identification of Endophytic Fungi from the Roots of *Avicennia sp.* at Las Piñas-Paranaque Critical Habitat and Ecotourism Area

Ace Bryan S. Cabal, MSc and Joshua Mark P. Nombre
Adamson University
abscabal@adamson.edu.ph

Endophytic fungi live in close association with plants and are one of the most common sources of secondary metabolites and bioactive compounds. The discovery of novel species of endophytes is important in conservation and in consideration for future biotechnological and pharmaceutical applications. The aim of this study was to isolate, characterize and identify the endophytic fungi that were collected from the roots of the mangrove *Avicennia sp.* at Las Piñas-Paranaque Critical Habitat and Ecotourism Area. The study employed phenotypic, molecular, and phylogenetic methods in the identification and classification of the fungal isolates. Two species of fungal endophytes were isolated, characterized and identified from the roots of Avicennia sp. i.e, *Fusarium pseudocircinatum* and *Penicillium solitum*. Moreover, the results were plausible since phylogenetic analyses showed a high number of confidence level in a 1000 bootstrap value. Further studies are warranted to determine the biotechnological and pharmaceutical potential of the identified fungal endophytes.

Isolation, Characterization and Identification of Fungal Endophytes from the Leaves of the Mangrove *Avicennia* sp.

Ace Bryan Cabal and Camille Anne Duzon
Adamson University
abscabal@adamson.edu.ph

Endophytes are organisms that colonize plant tissues without causing disease to their host plant. These organisms are plants' natural symbionts which are responsible for the growth of their plant host as well the production of different compounds. In this study, a mangrove species, *Avicennia sp*. was screened and studied for the presence of fungal endophytes. The fungal endophytes were isolated from the leaves of *Avicennia sp*. collected from Las Piñas – Parañaque Critical Habitat and Ecotourism Area (LPPCHEA). The study used phenotypic, molecular, and phylogenetic methods in the identification and classification of the fungal isolates. One species of fungal endophyte was isolated, characterized and identified from the leaves of *Avicennia sp*. which is *Penicillum solitum*. Furthermore, the results were acceptable since phylogenetic analysis showed a high number of confidence level in a 1000 bootstrap value. Further studies are warranted to determine the biotechnological and pharmaceutical potential of the identified endophytes.

Macroscopic Fungi at Quezon Protected Landscape, Southern Luzon, Philippines

Minerva Capon-Arenas[1], Edwin R. Tadiosa[2], Grecebio Jonathan D. Alejandro[3] and Renato G. Reyes[4]

[1]Biology Department,Institute of Arts and Sciences, Far Eastern University
[2]Philippine National Herbarium, National Museum of the Philippines, P.Burgos St., Manila
[3]The Graduate School and Research Center for the Natural and Applied Sciences,University of Santo Tomas, Manila
[4]Center for Tropical Mushroom Research and Development, Department of Biological Sciences, College of Arts and Sciences, Central Luzon University, Science City of Muñoz, Nueva Ecija

A research on the macroscopic fungi was conducted at Quezon Protected Landscape from the months of March to December 2014. Using transect line (TL) method, three transect lines were established from the baseline (80masl) toward the peak of Pinagbanderahan (420masl) with 20m x 30m quadrat sampling with an interval of 50 meters between quadrats. All in all, 18 quadrats were laid out. The fungal species within the quadrats along the TLs were identified and recorded. Field sampling of fungi resulted to the identification of 23 families, 39 genera, and 69 species with a total of 260 individuals. Of which 62 are basidiomycetes and 7 areascomycetes.
Among the significant findings include *Dacryopinaxspathularia*(Shwein.) Martin*,Cookeinatricholoma* (Mont.) Kuntze*, Microporusaffinis* (Blume& T. Nees.)Kuntze*, Microporusxanthopus*(Fr.) Kuntze*, Pycnoporussanguineus* (Fr.) Murr*., and Ganodermaapplanatum*(Pers.) Pat., as the new record fungal species in Quezon, and two possible new species of the genus *Polyporus* and *Ganoderma*. Further field surveys of the Landscape are anticipated to uncover a rich and diverse fungal flora including the unexplored area.

Two Frequently Confused Genera of the Marine Red Algal Flora of the Philippines: *Claudea* Lamouroux and *Zellera* G. Martens (Rhodophyta: Delesseriaceae)

Lawrence M. Liao[1, 5], Luisito T. Evangelista[2], Ivan Patrick B. Tualla[3] and Paul John L. Geraldino[4]

[1]Aquatic Botany Laboratory, Graduate School of Biosphere Science, Hiroshima University, 1-4-4 Kagamiyama, Higashi-Hiroshima, 739-8528 Japan[2]Botany Division, National Museum of the Philippines, Rizal Park, Manila, Philippines[3]Department of Biological Sciences, Visayas State University, Visca, Baybay City, 6521-A Leyte, Philippines[4]Phycological Herbarium, Department of Biology, University of San Carlos, Talamban, Cebu City 6000, Philippines[5]Corresponding author: lliao@hiroshima-u.ac.jp and/or algaeliao@gmail.com

The Delesseriaceae are among the most strikingly beautiful elements of the tropical and temperate marine flora. In the Philippines, sixteen species and ten genera have been reported. Among the Delesseriaceae reported from the Philippines are two superficially similar genera characterized by flabellate blades subtended by a prominent rachis, namely *Claudea* Lamouroux and *Zellera* Martens. Three Philippine species present identification challenges: *Claudeabatanensis* Tanaka (type: Batan Is., Philippines), *C. multifida* Harvey (type: Sri Lanka) and *Zellera tawallina* Martens (type: eastern Indonesia). One of the distinguishing morphological features between them is the placement of the tertiary branchlets which are issued adaxially in *Claudea*, while in *Zellera*, they are positioned abaxially. Current literature showed errors which have been perpetuated to this day. Verification of materials in some herbaria and critical examination of literature revealed that there is only one species to be recognized under each genera and that *C. multifida* should be excluded.

Polyphasic Taxonomy in the Marine Bioluminescent Bacteria and the Proposition of *Vibrio philippinensis* sp. nov. for the bioluminescent *Vibrio parahaemolyticus*-liked Bacterium Isolated From *Penaeus monodon* (Black Tiger Shrimp)

Coleto, Ma. Rosalina M., Gardoce, Joselito A., Gonzales, Marvin J., Ibarra, Ma. Therese V., Pereda, Jacqueline R., Thomas Edison dela Cruz and Edward A. Quinto

Department of Biological Sciences, College of Science, University of Santo Tomas, España, Manila

Five bioluminescent, marine, gram-negative, rod-shaped bacteria that are 1.5 – 2.5 µm in size were isolated from *Penaeus monodon* (Black Tiger Shrimp) acquired from the Las Piñas Public Wet Market. These isolated bacteria coded LB05, LB07, LB08, LB11 and LB12 underwent morphological, cultural, biochemical and physiological characterizations using conventional microbiological methods, the API 20-E system and the 16S rRNA gene sequencing. Results of these tests showed several phenotypic characteristics differentiated bacterial isolate LB05 from the four other isolates. These findings were also proven by the phenetic tree generated by the Numerical Taxonomy System for personal computer (NTSYS-pc) as well as by the 16S rDNA sequencing alignments. The trimmed forward sequences of each bacterial isolates were used for the phylogentic analysis. A Neighbor-Joining phylogenetic tree was then generated from the analysis, which revealed that four of the five isolates, LB07, LB08, LB11 and LB12 were members of the genus *Photobacterium* and all were closely related to *Photobacterium leiognathi* with an alignment of 99%. However, the phylogenetic tree of isolate LB05 composed of a 1,513 bp branched out from the Vibrio group composed of *Vibrio diabolicus, Vibrio parahaemolyticus, Vibrio natriegens* and *Vibrio owensii* to form its own separate clade. Isolate LB05 was also observe to grow fast where inoculated plates shows visual colonial growth in 6 hours time. Based on both phylogenetic and phenotypic evidences, the four isolated bacteria, LB07, LB08, LB11 and LB12 were identified as *Photobacterium leiognathi* species while LB05 yielded an alignment of 98% with *Vibrio parahaemolyticus.* Many phenotypic characteristics of LB05 did not match the characteristics of *Vibrio parahaemolyticus.* Pending a DNA-DNA Hybridization analysis, the phenotypic characterizations and the constructed phylogenetic tree showed that isolate LB05, a bioluminescent indigenous strain, is a potentially novel bacterial species with the proposed name: *Vibrio philippinensis* that belongs to the genus *Vibrio*.

Filling in the gaps: using biogeographic patterns in finding new species

Juan Carlos T. Gonzalez

UPLB Museum of Natural History and Institute of Biological Sciences, University of the Philippines Los Banos, College, Laguna 4031jtgonzalez@up.edu.ph

The Philippines is a global hotspot for biodiversity, known to have one of the world's highest turnovers of new species, often a result of recent discoveries from comprehensive expeditions, and taxonomic splits using phylogenetic analysis and standardised species delimitation. A dynamic country checklist for terrestrial wildlife remains unstable due to periodic surveys by museums and academic institutions. The prevailing checklist provide new insights on biogeographic patterns and distribution of endemic taxa across the archipelago, confirming changes from Neo-Wallace's and Huxley's lines. Thus, the need to apply updates from taxonomic changes in previously prescribed Faunal Regions; Endemic Bird Areas; and Pleistocene Aggregate Island Complexes. Plotting together revisions from three zoogeographical regions provide a combined pattern for terrestrial vertebrates, indicating regions that harbour potential new species or splits based on gaps from represented 'superspecies' distributions. This combined pattern also indicate priority areas for biodiversity research and conservation in the Philippines.

Taxonomy of Two Endemic Philippine Calanoid Copepods: *Pseudodiaptomus brehmi* Kiefer, 1938 and *Diaptomus vexillifer* Brehm, 1933

Shea Kathleen P. Guinto[1] and Rey Donne S. Papa[1,2,3]

[1]The Graduate School, [2]Research Center for the Natural and Applied Sciences and [3]Department of Biological Sciences, University of Santo Tomas, Manila, Philippinesshea.guinto@gmail.com and rspapa@ust.edu.ph

There are currently eight known species of Philippine freshwater calanoid copepods and two of which, *Pseudodiaptomus brehmi* Kiefer, 1938 and *Diaptomus vexillifer* Brehm, 1933, still lacks detailed descriptions that are essential for taxonomic identification. Suspected male and female *P. brehmi* and *D. vexillifer* specimens collected from Lake Taal, Batangas and Lake Danao, Leyte respectively were examined and taxonomically informative characteristics were tabulated, drawn, and used for species comparison between all known Philippine freshwater calanoids to confirm their current taxonomic status. The male *P. brehmi* is distinguishable from other Pseudodiaptomids in the country by its fifth pereopod lacking medial pointed processes in the first segment of the left exopod, while the female *P. brehmi* is distinguishable from other Pseudodiaptomids in the country by having a genital double somite that lacks lateral spines. The distinguishing characteristic of a male *D. vexillifer* from other Diaptomids is the presence of a sigmoid-shaped protrusion forming into a 'flap' on the second segment of the right basipodite of its fifth pereopod. Preliminary analyses show that this sigmoidal protrusion evident in *D. vexillifer,* also present in *Filipinodiaptomus insulanus* which is relatively smaller but similar, and its possible absence in other Diaptomids may indicate the inclusion of *D. vexillifer* in the genus *Filipinodiaptomus.* This study identifies the current taxonomic status of two endemic calanoids present in two Philippine lakes by providing a comprehensive taxonomic description, and update the current species listing of calanoid copepods present in the country. The immediate need for taxonomic analyses on these endemic species in Philippine lakes is due to a threat of displacement posed by the presence of the invasive Neotropical calanoid copepod, *Arctodiaptomus dorsalis.*

Preliminary Survey of Frog Species in Baguio-Benguet Area and Detection of Fungal Symbionts using Standard PCR Assay

Camille Andrea Flores, Arthien Lovell Pelingen*, Axel John Briz, Roland Hipol, Celia Austria
University of the Philippines Baguio, Gov. Pack Road, Baguio City 2600
*arthienpelingen@gmail.com

In 2012, 104 Philippine anuran species were documented. However, herpetofaunal biodiversity along the Cordilleran Mountainsis still poorly understood. This study focused on the preliminary survey by conducting visual encounters in the localities of Baguio, Tuba, and La Trinidad in the province of Benguet. We have opportunistically collected five species of frogs namely *Kaloularigida, Kaloulapicta*, *Sanguirana luzonensis*, *Limnonectes macrocephalus*, and an invasive species, *Rhinella marina*. Their identification was based on morphological diagnostic features and distinctive calls. From these frogs, seven fungal species were isolated which are *Penicillium solitum, Penicillium citrinum, Penicillium lanosum, Cladosporium sphaerospermum, Talaromyces amestolkiae, Mucor circinelloides,* and *Rhodotorula glutinis*. Combined morphological observation and molecular identification confirmed the identity of these fungi. To date, this is the first report on frog biodiversity in Baguio-Benguet Area after Taylor's study in 1922, contributing to the establishment of current species assessments and serves as a baseline information for conservation efforts.

Detection of *Crocodylus mindorensis* x *Crocodylus porosus* (Crocodylidae) hybrids in a Philippine crocodile systematics analysis

JOHN ARIES G. TABORA[1], MA. RHEYDA P. HINLO[2], CAROLYN A. BAILEY[3], RUNHUA LEI[3], CAYETANO C. POMARES[1], GLENN REBONG[4], MERLIJN VAN WEERD[5,6], SHANNON E. ENGBERG[3], RICK A. BRENNEMAN[3,7] & EDWARD E. LOUIS, JR.[3]

[1]Department of Biological Sciences, University of Southern Mindanao, Kabacan, North Cotabato 9407 Philippines

E-mail: johnariestabora@yahoo.com, pomarescayetano@yahoo.com[2]Ecology Department, Institute of Natural Resources, Massey University, Palmerston North 4442 New Zealand [3]Grewcock Center for Conservation and Research, Omaha's Henry Doorly Zoo and Aquarium, 3701 South 10th Street, Omaha, NE 68107 USA [4]Palawan Wildlife Rescue and Conservation Center, Puerto Princesa City, Palawan 5300 Philippines [5]Institute of Environmental Sciences, Leiden University, PO Box 9518, 2300 RA Leiden, the Netherlands

[6]Mabuwaya Foundation, ISU Garita, Cabagan 3328, Isabela, Philippines

The Philippine crocodile (*Crocodylus mindorensis*) is considered one of the most endangered of the crocodilian species. Philippine crocodiles samples used came from captive and free-ranging populations. Mitochondrial DNA D-loop fragments were sequenced for each crocodile and compared to 28 individuals representing ten crocodile species. Among Philippine crocodiles, 48 variable sites were identified, which defined six *C. mindorensis* haplotypes and one *C. porosus*-derived haplotype. Data generated for a 965 bp fragment of the ND4 subunit resulted to 91 variable sites identified, which defined three *C. mindorensis* haplotypes and one *C. porosus*-derived haplotype. From the nuclear genome, the C-*mos* gene was amplified and two variable sites were identified. These sequences were compared to GenBank sequences for *C. porosus*. Of the 619 Philippine crocodile samples, 57 samples were found to harbor D-loop haplotypes identified as *C. porosus* and 31 of those harbored C-*mos* mutational sites diagnostic for *C. porosus* introgression.

Understanding rice root-knot nematode *Meloidogyne graminicola* populations in the Philippines: life cycle and characterization

Ma. Teodora Nadong Cabasan

Department of Biological Sciences, College of Arts and Sciences, University of Southern Mindanao, 9407, Kabacan, Cotabato, Philippines

The rice root-knot nematode, *Meloidogyne graminicola*, is one of the most important nematode species associated with upland rice. Completion of the life cycle of *M. graminicola* from second-stage juvenile (J2) to second-generation J2 at 29/26°C (day/night temperature) was 20 days and 19 days at 36/32°C on the susceptible rice UPLRi-5. The number of second-generation J2 was significantly higher at 29/26°C compared with 36/32°C under non-flooded conditions. Five populations of *M. graminicola* isolated from rice-growing areas in the Philippines with different agro-ecological conditions showed less variability in J2 phenotype, genotype and female perineal pattern. The five *M. graminicola* populations exerted the same level of aggressiveness on resistant and susceptible rice genotypes. Mature *M. graminicola* females that had developed in the resistant rice genotypes were significantly smaller and produced fewer eggs than the ones in the susceptible rice genotypes. The absence of resistance-breaking populations of *M. graminicola* is important for the maintenance of durability of resistance to this important rice pathogen

Diversity Assessment of Edible Bivalves in the Inter tidal Zone in Pilar Bay

Philomel Innocent P. Obligar

Capiz State University – Pilar, Capiz philomelinnocentobligar@yahoo.com

Municipality of Pilar is the last town in the Province of Capiz in the east. It is blessed with a 20-kilometer squares Pilar Bay. It is the sources of an abundant fishery products. During low tide, the shoreline portion of the bay can be found different kinds of edible bivalve shells which is the source of income of the nearby residents. Utilizing the descriptive research this study aimed to determine and assessed the diversity of edible bivalves that exist in the inter-tidal zone of the Municipality of Pilar. This study was conducted in Pilar Bay that covers 9 barangays on three spate weekends with the first beings December 26-27, 2015, second January 9-10, 2016 and the third and final survey January 16-17, 2016. Study area was selected during low tide. A belt transect method was used. Three (3) 1 x 1 m2 quadrat was laid down in each station. A total enumeration Technique was used in this study. All species found in each quadrat was identified, listed and enumerated. Identification of bivalve species was made in the site. Specimens was collected put in a jar and was subject for further process of investigation such as color, length and texture of the shell.In measuring the diversity of bivalve species found in the coastal areas of Pilar, the researcher use the formulas as introduced by Curtis & McIntosh (1950) and Simpson's Divesity Index. Result revealed that there were seven (7) edible bivalves found in Pilar Bay. These were locally known as *paros, litob, punaw, bug-atan, higda-higda, tikhan and kagaykay*. The species found belongs to the family: *Arcidae, Linguli-dae, Veneridae, Psammobidae, Mactridea and Solenidae*. The data also shows that *litob, punaw, higda-higda, bug-atan and kagaykay* have a frequency of 100%. *Punaw* is the most abundant edible bivalves in Pilar Bay followed by *litob, higdahigda, bug-atan, kagaykay, paros and tikhan*.As to its ecological distribution, *paros* occurred only in four (4) Barangay s namely: Natividad, Casanayan, Balogo and Dayhagan. Ugpan occurred only in six (6) Barangays namely: Nativdad, Poblacion, Casa-nayan, Balogo, Dayhagan and Dulangan. *Litob, Punaw, Higdahida, bug-atan and kagaykay* can be found in all sample barangay.

Species Level Assessment of Freshwater Crabs in Mindoro with Special Reference to Baroc River Catchment, Roxas, Oriental Mindoro

Alfredo P. Carpio Jr.

Ateneo de Manila University School of Science and Engineering Department of Biology, Katipunan Avenue, Loyola Heights Quezon City, Philippines 1108Email: alfredo_carpio9@yahoo.com

This study aims to gain knowledge in species composition and taxonomy of freshwater crabs in Mindoro with concentration in Baroc River catchment in Roxas, Oriental Mindoro for their zona-tion patterns along longitudinal stream courses and altitudinal gradient. Characteristic microhabi-tat was observed for the different freshwater crabs collected. Four species were sampled from the site namely *Mindoron pala* NG & TAKEDA, 1993, *Parathelphusa mindoro* NG & TAKEDA, 1993, *Labuanium trapezoideum* H. MILNE EDWARDS, 1837, and *Sundathelphusa* sp. nov. Among the four species sampled from the site one was found to be a new species. The study includes diagno-sis of the specimen [with details on carapace margin, gonopods, pleopod (except male G1 and G2), third maxillipede, and mouthparts], diagnosis of the specimen and notes on distribution and habitat. After examining existing collections of freshwater crabs from Mindoro, another specimen was also found to be a new species of *Geosesarma.* Description of this new species was also in-cluded in this study besides those collected from the study site.

Cockroaches: from Condemnation to Conservation

Cristian C. Lucañas

University Research Associate, Entomological Section, Museum of Natural History, University of the Philippines Los Baños (UPLB-MNH)

Cockroaches (Dictyoptera: Blattodea) are one of the most diverse and abundant of the insect orders (>4500 described species excluding termites). Contrary to common belief, they occupy diverse ecological niche and may serve as keystone species in some ecosystems yet most of available studies focus on domiciliary or pest species. Currently, 127 true cockroach species (5 families) are recorded in the Philippines, only 12 of which are introduced while 63 are endemic to the country. Unfortunately, threats to cockroach biodiversity such as deforestation, poaching, pesticide use, importation and introduction of foreign wildlife are prevalent. The high percent endemicity due to the narrow distribution ranges provides insights on the need to conduct conservation efforts not just for cockroaches but for their environment. With this, further studies on the taxonomy and ecology of cockroaches, particularly on minimally explored ecosys-

Forest Spiders as Important Bioressource in Keeping Pest Populations in Check

Aimee Lynn A. Barrion-Dupo
Institute of Biological Sciences and Museum of Natural History, University of the Philippines, Los Banos, College, Laguna; abdupo@up.edu.ph

Comprehensive studies on Philippine forest spiders currently take a back seat to the larger more charismatic species. However, biodiversity studies requiring comprehensive taxonomic sampling of the country's biota as well as the popularity of maintaining an eco-agriculture landscape, studying species richness in Philippine forest systems become a priority concern. Results of documenting spiders in agroecosystems and forest ecosystems revealed a 22% overlap of species. This means that of the 529 species spider species recorded in the Philippines, 109 species can be potentially tapped as natural biological control agents in agroecosystems. Such findings further emphasize the need to conserve our forests.

Diversity and Status of Butterflies in Mt. Sipaka, Talisayan Misamis Oriental

Robert T. Llemit[1] and Joliesa Mae S. Toledo[2]
Biology Department, Central Mindanao University[1,2] oliesamaetoledo@gmail.com[2]

The study aimed to determine the diversity and local status of butterflies in Mt. Sipaka, Talisayan, Misamis Oriental. The butterflies collected were carried out using catching net and traps. The sampling techniques include belt transect, quadrat sampling, and opportunistic sampling from the month of November to December 2014.
The study revealed 36 species of butterflies collected from Mt. Sipaka, Talisayan Misamis Oriental. This belongs to five (5) families and 29 genera. Shannon Weiner index result showed H' values of 1.32 in grassland, 1.27 in agroecosystem and 1.22 indipterocarp. Grassland, agroecosystem and dipterocarp has low levels of diversity based on Kruger scale for insect diversity. There were six (6) Philippine endemic butterflies (19.44%) collected from Mt. Sipaka namely; *Catochrysopstrabo luzonensis, Ypthimastellerastellera, Eurema sarilatasarilata, Ypthimasemperachaboras, Oriens californica,* and *Tagaidesgana elegans*. *Eurema alithaalitha* was only one (1) Mindanao endemic collected. Local status of butterflies in Mt. Sipaka revealed 13 common butterflies' species, 12 very common butterflies species, 3 rare species of butterflies, and 8 very rare species of butterflies. Therefore, Mt. Sipaka is a home of the 36 species of butterflies with low diversity level and endemism.

Young Systematic Biologist Forum

Undergraduate Level

Taxonomy and Distribution of Freshwater Zooplankton from Groundwater Ecosystems in Bulacan, Philippines

Ysabel Grace C. Cavite[1], Jannah B. Juan[1], Moses Isaiah L. Koh[1], Mark Louie Lopez[2], and Rey Donne S. Papa[1,2,3]

[1] Department of Biological Sciences, College of Science, [2] The Graduate School and [3] Research Center for the Natural and Applied Sciences, University of Santo Tomas, Manila, Philippines 1015

Groundwater being an important water source in the Philippines also inhabits freshwater zooplankton[1] but have limited studies centered on it. Zooplankton are good bio-indicators due to their sensitivity to their habitat making them suitable indicators for environmental changes[2], which may be utilized in knowing current environmental health status of most freshwater ecosystems[2] – in this study, groundwater ecosystems such as caves, open-wells, pumped groundwater pipes and springs. Samples were collected using 45µm and 60µm mesh size plankton nets which were then processed, sorted and identified in the laboratory. Morphological features were examined and the species were identified using taxonomic keys. The results show that 13 species were found and identified – Rotifera (4), Cladocera (4), Copepoda (5) – in the 16 sampling sites of Bulacan with one new record species. Pinagrealan Cave showed to be the most diverse and most abundant site, followed by Bayabas Well and Pinagrealan Well out of the 10 sites that inhabit zooplankton as shown in Figure 1. A new record for the Harpacticoida in the Philippines, the *Elaphoidella bidens* (Figure 2) has also been found in Biak na Bato Poso.

Phylogeny of selected Philippine *Ophiorrhiza* L. (Ophiorrhizeae—Rubiaceae) inferred from multiple sequence data including accounts of two new species

Yñigo Luis del Prado[1], Nadia Mariella Diestro[1], Frederick Ferdinand Gomez[1], Princess Bituin Tapire[1], and Grecebio Jonathan Alejandro[1,2]
[1]Department of Biological Sciences, College of Science, [2]Research Center for the Natural and Applied Sciences, University of Santo Tomas, España Blvd., Manila 1015 Corresponding author: ynggru@gmail.com

Ophiorrhiza L. is a complex genus of Rubiaceae with high endemicity in the Philippines (29 out of 31 species recorded). Members are characterized by helicoid cymes and dry, rhomboidal fruits. Despite its use in medicine, particularly cancer treatment, no worldwide treatment of the genus was ever attempted due to (1) its taxonomically complex nature and (2) the great number of its members. Bayesian inference and Maximum Parsimony of combined ITS, *rbc*L and *rps16* datasets were utilized. Results highly support the monophyly of *Ophiorrhiza* (PP=1.00, BS=90%) and revealed two distinct subclades of the included Philippine species. Subclade A (PP=0.99, BS=88) with species having axillary inflorescences, caducous stipules, and glabrous stems, and subclade B (PP=0.95, BS=98%) with species having terminal inflorescences, persistent stipules, and pubescent stems. Two new species are proposed as *Ophiorrhiza malinaoensis* recognized by its cupuliform corolla lobe shape, linear lanceolate leaves, and brownish-red when dry, and *Ophiorrhiza amplistipula* characterized by long stipules and entirely pubescent organs.

Phylogenetic placement of selected Philippine Gardenieae using cpDNA molecular datasets

Christian Emmanuel E. Braganza[1], Catherine Louise N. Chua[1], Hedder A. Lim[1], Bennett O. Tia[1], and Grecebio Jonathan D. Alejandro[1,2]

[1]Department of Biological Sciences, College of Science, [2]Research Center for the Natural and Applied Sciences, University of Santo Tomas, España Blvd., Manila 1015

The family Rubiaceae is comprised of several complex groups such as the tribe Gardenieae. This tribe is commonly known as the thorny Rubiaceae represented by *Benkara, Fagerlindia* and *Oxyceros.*[2] They possessed overlapping morphological features like organization of orthotropic shoot, development of hooks or thorns in plagiotropic branches from orthotropic axis, and stipule shape. In this study, an attempt to resolve this complexity was done using combined *trn*T-F, *rbc*L, *rps*16 and *ndh*F dataset of selected Philippine representatives. *Oxyceros patulus, Oxyceros bispinosus, Benkara microcarpa,* and *Benkara emanuelssoniana* were subjected to DNA extraction, amplification, purification, sequencing and morphological characterization. Results revealed that morphological delineations of previous studies done[1-2] are inconsistent with molecular evidence as there is no single monophyletic generic group identified within the complexity. Molecular results show that *Fagerlindia* is paraphyletic with respect to *Oxyceros* and *Benkara* nested within the Aidia group (BS=78). Due to the subtle differences of characteristics in *Fagerlindia* and *Benkara*, the two genera should be treated as congeneric as earlier proposed.[2]

Pollen Morphology and Pollen Germination of Two Endemic Philippine *Etlingera* Giseke (Zingiberaceae) Species

Noe P. Mendez*, Florfe M. Acma, Heidi C. Porquis and Evangeline B. Sinamban

Biology Department, College of Arts and Sciences, Central Mindanao University, University Town, Musuan, Bukidnon, Philippines *Corresponding author:npolomendez@gmail.com

Etlingera dalican (Elm.) A.D.Poulsen and *Etlingera philippinensis* (Ridl.) R.M.Sm. are both Philippine endemic species. Pollen grains were gathered from live samples and subjected to light microscope and scanning electron microscope (SEM) examinations. Data revealed that pollens measured 9-12 µm (*E. dalican*) and 6-9 µm (*E. philippinensis*), having circular-spheroidal (hydrated) and irregular (dry) in shape for both species, greenish-yellow (*E. dalican*) and greenish (*E. philippinensis*) color. Both species were inaperturate but gemmate (*E. dalican*) and psilate (*E. philippinensis*) in their ornamentation. *E. dalican* have 88.56% pollen viability while *E. philippinensis* have 40.69%. Percentage germination of *E. dalican* revealed 61.66% while 31.90% for *E. philippinensis*. The rate of pollen tube growth for *E. dalican* was faster than in *E. philippinensis.* Hence, pollen microscopic studies are taxonomically important to delineate species as well as give us insights on the reproductive propagation of the endemic species which have potential for economic and horticultural uses.

Genetic Diversity of *Ixora macrophylla* with a Preliminary Report on its Phytochemical Components

Czarina Alexei S. Gaticales[1], Ellize Gail P. Gonzales[1] , Juan Karlo L. Marquez[1] , Gabriel Louis L. Montalbo[1] , Grecebio Jonathan D. Alejandro[1,2,3], and Cecilia I. Banag [1,2,3]

[1]Department of Biological Sciences, College of Science, [2]Research Center for Natural and Applied Sciences, Thomas Aquinas Research Complex, [3]Graduate School, University of Santo Tomas, España, Manila 1015 Corresponding author: gabriellouis.montalbo@gmail.com

In the Philippines, there are about 31 species of *Ixora* and 25 of which are endemic to the country, including the widespread *Ixora macrophylla* Bartl. Nowadays, genetic analyses are being utilized to better understand the biological and ecological impacts of changes in population size and ranges of endemic species. Species with high number of populations may undergo population bottlenecks, resulting in low genetic diversity. Therefore, this study aims to better understand the genetic diversity of *I. macrophylla* and to provide a preliminary report regarding the phytochemical components of this endemic species. Nine sequences from the ITS nuclear region and eleven sequences from the *trnL-F* chloroplast region were used in this study. Number of haplotypes, haplotype diversity, and genetic diversity among the different populations of *I. macrophylla* collected from Aurora, Occidental Mindoro, and Surigao del Norte were determined using the DnaSP 5.10.1 program. Two haplotypes were identified for trnL-F where one haplotype is shared by the populations from Surigao del Norte and Aurora, while the other haplotype is only found in the populations from Mindoro. Eight haplotypes were retrieved in ITS where 3 haplotypes each are restricted to Mindoro and Aurora and two haplotypes are found only in Surigao populations. The Mantel test returned a negative correlation coefficient of -0.0830 for *trnL-F* and -0.3810 for ITS indicating a negative correlation between geographic and genetic distances. Furthermore, the phytochemical tests revealed the presence of phenols, tannins, flavonoids, cardenolides, coumarins, triterpenoids, and steroids in the leaf ethanolic extract of *I. macrophylla.*

Young Systematic Biologist Forum

Graduate Level

Third species of *Vanoverberghia* Merr. (Alpinieae: Zingiberaceae) discovered in Aurora, Philippines

Rudolph Valentino A. Docot[1] and Cecilia I. Banag[1,2,3]

[1] The Graduate School, [2] College of Science, [3] Research Center for Natural and Applied Sciences, Thomas Aquinas Research Center, University of Santo Tomas, España Boulevard, Sampaloc 1015, Manila, Philippines. Corresponding author: dukerudolph@gmail.com

Vanoverberghia Merr. is a small genus inside the ginger family Zingiberaceae with only two described species, *Vanoverberghia sepulchrei* Merr. of the Philippines and *Vanoverberghia sasakiana* H. Funak. & H. Ohashi of Taiwan. This genus is exceptional in the family by their bifid labellum with subulate lobes, lateral corolla lobes that are basally connate to each other and to the labellum, filiform lateral staminodes, and absence of bracteoles. In this study, the third species of *Vanoverberghia* is described and illustrated here. This new species is unique from the two known species by its pubescent ligules, margin of sheaths, and leaf margin, subsessile leaves, puberulent peduncle, rachis, pedicel, and ovary, corolla tube that is exerted from the deeply split spathaceous calyx, linear anther, presence of small puberulent anther crest, and globose fruits. Furthermore, this new species shows affinity with the very unique *Alpinia vanoverberghii* Elm., suggesting the transfer of*A. Vanoverberghii* to the genus *Vanoverberghia*.

Saving our slime molds (SOSm): a comparative diversity study on the slime molds of two lowland forests in Mindoro Island, Philippines and its implication to biodiversity conservation

Melissa Pecundo[1, 3],Nikki Heherson Dagamac[4], Martin Schnittler[4] and Thomas Edison dela Cruz[1, 2,3]

[1]The Graduate School, [2]Department of Biological Sciences, College of Science, and [3]Fungal Biodiversity and Systematics Group, Research Center for the Natural and Applied Sciences, University of Santo Tomas, España 1008 Manila, Philippines
[4]Institute of Botany and Landscape Ecology, Ernst Moritz Arndt University Greifswald, Soldmannstr. 15, D-17487, Greifswald, Germany
Corresponding author: melissa.pecundo@gmail.com

The influx of ecotourists in Mindoro Island can greatly impactthe island's biodiversity including the poorly documented slime molds or myxomycetes.A total of 1,260 moist chambers were set-up from substrata, i.e., aerial (AL) and ground (GL) leaf litter, woody vines (WV), and twigs (TW), collected in two lowland forests in Mt. Malasimbo and Mt. Siburan in Mindoro Island. In this study, we identified51 species of myxomycetesbelonging to 17 genera. A relatively high number of species was recorded in Mt.Siburan than in Mt. Malasimbo. Four species were recorded as abundant in both study sites. The assessment of species diversity showed that Mt. Siburan had higher species diversity, richness and evenness than Mt. Malasimbo. This research study is the most comprehensive ecological survey of myxomycetes in Mindoro Island. We present also our effort to promote biodiversity conservation through a learning material on slime molds for kids.

Evaluation of five DNA loci (*rbc*L, *rps*16, *trn*T-L, *trn*L-F, and ITS) for molecular authentication and phylogeny reconstruction of Philippine *Argostemma* species (Rubiaceae) including a new account of species and variety

Hao Wei Hsu*[1] and Grecebio Jonathan D. Alejandro[1,2,]

[1]*The Graduate School and* [2]*Research Center for the Natural and Applied Sciences, University of Santo Tomas, Espana, Manila 1015 Philippines* *Corresponding author: hsuhaowei@yahoo.com

The paleotropical genus *Argostemma* Wall. is the largest genus under the tribe Argostemmateae comprising about 220 species. In the Philippines, misidentification of its members has been apparent due to their morphological homogeneity making it difficult and undertreated. To address this issue, several *Argostemma* species were collected from seven localities and were subjected to taxon differentiation and phylogenetic analysis. In the study, the Philippine *Argostemma* is proved to monophylethic and is exhibited to be closely related to the Phychotriochodes group based Bayesian and parsimony inference of the combined data sets (*trn*L-F, *trn*T-F, *rps*16, *rbc*L, and ITS) with a strong support (PP=1.0, BS=100%). A novel species and a variety collected from Mt. Halcon, Oriental Mindoro, are here proposed. The evaluation of the best DNA barcode among the five markers utilized revealed that based on universality, discriminatory power, and resolution, ITS gave the most promising result by yielding the highest discriminatory and authentication power.

Phylogeny and DNA Barcoding of Philippine *Hedyotis* L. (Rubiaceae: Spermacoceae) inferred from nuclear (ITS) and chloroplast (*pet*D, rps16, *trn*H-*psb*A) DNA markers

Propa Joy R. Santor[1], Grecebio Jonathan D. Alejandro[12]

[1]The Graduate School, University of Santo Tomas, España, Manila, 1015, Philippines
[2]Research Center for the Natural & Applied Sciences, University of Santo Tomas, España, Manila, 1015, Philippines Corresponding author: propa_21@yahoo.com

Hedyotis L. and related genera are highly debated groups in Rubiaceae. Previous molecular studies identified 13 well-supported monophyletic groups across the *Hedyotis-Oldenlandia* complex including a defined *Hedyotis* s. str. group with no Philippine representatives. Hence, the first molecular study of Philippine *Hedyotis* is here presented. Twenty-six (26) accessions belonging to 19 species were collected from 11 Philippine provinces. Morphological and molecular analyses support the taxonomic placement of the endemic *H. atropurpurea, H. longipendiculata, H. microphylla, H. papafranciscoi,* and *H. pilosissima* in the *Hedyotis* s. str. clade. The same analysis revealed *that Exallage buruensis, Oldenlandia apoensis* and *O. yoderi* should be reinstated to *Hedyotis* and *H. vestita* to *Exallage*. The present study also tested the efficiency of ITS, *pet*D, *rps*16, *trn*H-*psb*A as single-locus barcode for Philippine *Hedyotis*. The analyses revealed that ITS is the best barcode for molecular authentication of Philippine *Hedyotis* as it exhibited relatively high universality while having the highest discrimination ability, and species resolution.

Tracing the evolutionary origins and relationships of the Philippine *Neonauclea* Merr. (Rubiaceae: Naucleeae)

Jorge Anton D. Ordas[1], Grecebio Jonathan D. Alejandro[1, 2]

[1]The Graduate School, University of Santo Tomas, España, Manila, 1015, Philippines
[2]Research Center for the Natural & Applied Sciences, University of Santo Tomas, España, Manila, 1015, Philippines
Corresponding author: ordas.jorge@yahoo.com

Owing to its complex geological history and its rich and highly endemic biota, Philippines emerged as a universal model in understanding evolutionary patterns within island archipelagos, yet well-sampled angiosperm phylogenies across the region are still lacking. Previous molecular studies on *Neonauclea* have failed to examine Philippine representatives, and its monophyly remains unresolved. Hence, the first molecular study of the Philippine *Neonauclea* is presented. Combined analyses through Bayesian and parsimony inferences confirm their affinities within *Neonauclea* and highlights the polyphyly of the Philippine species, with representatives recovered from different lineages. However, the monophyly of *Neonauclea* pends further investigation. Results from the Statistical Dispersal-Vicariance analysis suggest a complex biogeographical account for *Neonauclea*, with several dispersal and vicariance events that led to its present distribution and diversity. The archipelago may have served as the bridge between Asia and the Pacific for the colonization of the Philippine lineages, where they simultaneously radiated and evolved.

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Odonata Fauna of Riparian Habitats in Selected Areas of Luzon and Mindoro Region

Randel Estacio[1], Hendrik Freitag[2] & Raegan Joseph Vilanueva[3]

[1]Ateneo de Manila University, Department of Biology, Katipunan Ave., Loyola Heights, Quezon City, 1108, Philippines;[2]Ateneo de Manila University, Department of Biology, Katipunan Ave., Loyola Heights, Quezon City, 1108, Philippines; [3]D3C Gahol Apartment, Lopez Jaena St., Davao City, 8000, Philippines. Email Address: mr.rdestacio@yahoo.com

Odonata are considered as potential indicator of environmental disturbances. Despite of great efforts in recording the Odonata fauna of the Philippines in general, the riparian habitats in Bataan/ Subic Bay (Luzon) and Mt. Hinunduang/Baroc River Catchment (Mindoro) are still unexplored. Due to continuous forest and freshwater habitat destruction, faunal survey of Odonata species is urgent. The present study surveyed selected riparian habitats in these regions in December 2015 to March 2016. A total of twenty four species belonging to eighteen genera (*Agriocnemis*, *Ischnura*, *Pseudagrion*, *Teinobasis*, *Risiocnemis*, *Coeliccia*, *Rhinocypha, Cyrano*, *Euphaea*, *Neurobasis*, *Heteronaias*, *Diplacodes*, *Neurothemis*, *Orthetrum*, *Pantala*, *Potamarcha*, and *Trithemis*) were recorded and seven endemic species of the family *Platycnemididae*, *Euphaeidae*, and *Calopterygidae* were documented in both regions. The data collected contribute to the understanding of Odonata diversity and distribution in the regions and support future conservation and management strategies.

Taxonomy, Distribution and Conservation Status of *Nepenthes* L. (Nepenthaceae) in the Unbotanized Mountains of Central Mindanao, Philippines

Noel Lagunday[1], Florfe Acma[2], Veneracion Cabana[3], Novo Sabas[4] and Victor Amoroso[2]

[1] Central Mindanao University, University Town, 8710Musuan, Bukidnon, Philippines lagunday noel@gmail.com
[2] Department of Biology, College of Arts and Sciences and Center for Biodiversity Research and Extension in Mindanao, Central Mindanao University, University Town, 8710 Musuan, Bukidnon, Philippines [3] Mountain View College, College Heights, Valencia City, Bukidnon, Philippines [4] SULADS Comprehensive High School for the Lumads, Sto. Domingo, Lumintao Quezon, Bukidnon, Philippines

Botanical fieldwork investigations were conducted in the unbotanized mountains of central Mindanao situated at the province of Bukidnon. It aimed to determine the species composition, describe the distribution and determine the conservation status of the *Nepenthes* L. species present in the three mountains *viz.,* Mt. Malimumuof the Pantaron and Mt. Pinamantawan and Mt. Bilbilisan of the Tangkulan Mountain Ranges. Field survey employing at least three 5x500 meter transect method and opportunistic sampling were used on the three mountain sites. Results of the study revealed 5 *Nepenthes* L. species namely: *N. cornuta, N. pulchra, N. surigaoensis, N. talaandig* and *N. truncata.* The Mt. Pantaron harbors five species while Mt. Tangkulan has only three species. Two of the species, *N. cornuta* and *N. talaandig* are assessed as vulnerable and *N. truncata* is assessed as endangered.

Four Alien Monogeneans Parasitic on the Invasive Armored Catfish, *Pterygoplichthys disjunctivus* (Siluriformes: Loricariidae), from a Subtropical Island, Japan

Masato Nitta and Kazuya Nagasawa

Graduate School of Biosphere Science, Hiroshima University, 1-4-4 Kagamiyama, Higashi-Hiroshima, Hiroshima 739-8528, Japan. E-mail: licht.bsn.mono@gmail.com (M. N.)

Four alien monogeneans (Platyhelminthes), *Unilatus unilatus*, *U. brittani*, *Trinigyrus* sp., and *Heteropriapulus heterotylus* were collected from the gills of the vermiculated sailfin catfish *Pterygoplichthys disjunctivus* (Siluriformes: Loricariidae) in inland waters of Okinawa-jima Island, Okinawa Prefecture, Japan. *Unilatus unilatus* and *U. brittani* are described as new country records from Japan. *Trinigyrus* sp. is characterized by a coiled male copulatory organ which forms a circle and does not articulate with its accessory piece. *Heteropriapulus heterotylus* was newly collected from two rivers on central-southern Okinawa-jima Island. These monogeneans are considered to be native to South America and have been co-introduced with the host fish into the inland waters of the island through the release of ornamental pet fish. About 20 species of ornamental fishes have been recorded from Okinawa-jima Island, and it is most likely that ornamental fish trade is one of the major invasion

Update of the water scavenger beetle genus *Pelthydrus* D'ORCHYMONT, 1919 (Insecta: Coleoptera: Hydrophilidae) of the Philippines

Cassandra Caedo, Elijah de la Calzada, & Hendrik Freitag

Department of Biology, Ateneo de Manila University, Katipunan Ave., Loyola Heights, Quezon City, 1108, Philippines; Email Address: cassandracaedo@gmail.com

The genus *Pelthydrus* D'ORCHYMONT is comprised of small aquatic species of Water Scavenger Beetles (Hydrophilidae) and distributed mainly in the Oriental Region. It was last revised in the 1990s by Schönmann (1994, 1995) when six species were formally described from the Philippines. This paper updates the knowledge on the Philippine representatives by providing new records and one new species from the country among copious material examined from several repositories of natural history and from own field collections. Their diagnostic characters are illustrated by habitus and aedeagus images, along with the first (re-)diagnoses in English language. Additionally, DNA was extracted from many Asian *Pelthydrus* species and partial *COX1* mtDNA sequences were amplified, whenever possible, for the generation of a statistical parsimony haplotype network in order to provide support for the species and species group concept. The new species from Mindoro is distinguished by its aedeagal and other morphological characters.

Ten new species of *Ancyronyx* Erichson, 1847 (Insecta: Coleoptera: Elmidae) from Sulawesi, including a cryptic species group.

Hendrik Freitag[1] & Jan Kodada[2]

[1]Ateneo de Manila University, Department of Biology, Katipunan Ave., Loyola Heights, Quezon City, 1108, Philippines; [2]Department of Zoology, Faculty of Natural Science, Comenius University, Mlynská dolina B-1, SK-842 15 Bratislava, Slovakia. Email Address: hfreitag@ateneo.edu

Spider Water Beetles (*Ancyronyx* spp., Elmidae, Coleoptera) are small, but enigmatic aquatic insects with spectacular spider-like appearance. Most described species are known from the Philippines and some are used in biodiversity assessments and as bioindicators. Intense study of material in several collections, mainly in Europe revealed ten species previously unknown to science, all of them being endemic to the island of Sulawesi. They are recognized by their adeagal and other morphological characters. Diagnostic characters are illustrated by digital habitus images, microscopic line drawings of their sexual characters and SEM images of selected details. An updated checklist of *Ancyronyx* species of Sulawesi is provided. Cox1 mitochondrial DNA sequences were amplified to construct a haplotype network by the use of statistical parsimony. The molecular-genetic data confirmed our morphological species concept except for two taxa that showed only very little genetic distance, but are clearly distinguishable by their aedeagal characters.

Nuclear Ribosomal Dna (Its)-Based Phylogeny Of Selected Philippine Guettardeae (Rubiaceae) And A Proposal Of Nomenclatural Novelties

Julius John DP. Salamanes[1] and Grecebio Jonathan D. Alejandro[1, 2]

[1]The Graduate School, [2]College of Science and Research Center for the Natural & Applied Sciences University of Santo Tomas, España, Manila, 1015 Philippines
Email address: juliusgks_05@yahoo.com

The pantropical Rubiaceous tribe Guettardeae is comprised of ~500 species distributed in *ca.* 20 genera which exhibit diverse morphological heterogeneity making the circumscription of its taxa problematic. This monophyletic tribe is represented in the Philippines by three genera namely: *Antirhea* Juss, *Guettarda* L. and *Timonius* DC. As part of the ongoing assessment of the Philippine Rubiaceae, floristic surveys in the unexplored areas of Mt. Pocdol in Sorsogon, Mt. Redondo and Bucas Grande Islands in Surigao del Norte were conducted and five interesting Guettardeae species were encountered. Morphological-based identification suggests that the species belong to Guettardeae by possessing the essential characters of the tribe. Hence, this study evaluated the phylogenetic positions of these aberrant Guettardeae species using Bayesian Inference & Maximum Parsimony based from the Internal Transcribed Spacer (ITS) of the nuclear ribosomal DNA cistron to determine their generic affinities with certitude. Interestingly, the species nestled on the Paleotropical dioecious clade *sensu* Achille *et al.* (2006) with supports of PP=1.00; BS=69%. Specifically, four species were recovered within the moderately supported *Timonius* subclade (PP=0.91; BS=85%) while the other one revealed to be sister to *Antirhea foveolata* with strong supports (PP=1.00; BS=100%) and subsequently closely related to *Antirhea chinensis* within *Antirhea-Guettarda* complex subclade. Detailed morphological examinations to facilitate species identification using traditional α-taxonomic modalities were futile. Hence, four new species of *Timonius* and lone *Antirhea* are hereby proposed accompanied with comprehensive morphological descriptions, botanical illustrations, distribution maps, as well as their conservation status. This study is a substantial contribution to the ongoing inventory of Philippine Rubiaceae and yields additional information to the country's biodiversity.

Preliminary data on the genetic diversity of *Ixora philippinensis* on the basis of two chloroplast markers

Maria Felicia D. Tuazon [1]. Kim Patricia Nicole P. Valenzuela [1], Janina Myka G. Villaseran [1], Angelli Mutya L. Vivas [1], and Cecilia I. Banag[1,2]

[1]*Department of Biological Sciences, College of Science* [2]*Research Center for Natural and Applied Sciences, Thomas Aquinas Research Complex, University of Santo Tomas, España, Manila 1015* **E-mail:** ixoraphilippinensis.sb1516@gmail.com

A study on the phylogeny of Philippine *Ixora* revealed widespread *Ixora philippinensis* Merr. did not form natural lineages. Moreover, preliminary studies on herbarium specimens of *I. philippinensis* from different provinces in the Philippines showed morphological variations. 18 specimens representing populations from selected localities in the Philippines were included for molecular analyses. Pairwise distances, haplotypes, haplotype diversity, and nucleotide diversity among populations were determined. The phylogenetic tree of combined *trnLF* and *rps16* data showed *I. philippinensis* is polyphyletic. Among the populations, only those from Cebu formed a separate subclade, strongly supported by a **pp** of 0.93. 12 distinct haplotypes were identified, six each for *rps16* and *trnLF*. Genetic differentiation among populations can be attributed to six haplotypes with little nucleotide divergence. Furthermore, the presence of a widespread haplotype (from *rps16*) in almost all populations and a haplotype in at least two populations suggests gene flow among populations of *I. philippinensis* studied.

Species richness and conservation status of orchids in mansinagan ridge, almaciga eco park, Davao Oriental

-Precyla H. Garcia [1], Guiller S. Opiso[2] and Jennifer G. Opiso[3]

[1] Central Mindanao University, Musuan, Bukidnon [2] Philippine Eagle Foundation, Baguio District, Malagos, Davao City [3]Biology Department, Central Mindanao University, Musuan, Bukidnon, Philippines [1]gprecyla@gmail.com; [2]opisogui@gmail.com; and [3]mcgalvz@gmail.com

This study aimed to determine the orchid species composition, local and conservation status and endemicity. Sampling plots were established across vegetation types and an alpha taxonomy was done from base to ridge of the Park. Assessment of the conservation status was based on the IUCN (2015-4) and Fernando et al. (2008), endemicity was based on Cootes (2011) and Pelser et al. (2011 onwards) while local status was based on Panal et al. (2015). A total of 24 species belonging to 16 genera were found. Among 16 genera, *Dendrobium* was represented with 4 species while other 10 species with a single species. 23 species were unassessed and 1 is endangered. Locally, most species were rare. The study also revealed 7 Philippine endemic species, 10 new to the region and 4 new to Mindanao. Almaciga Eco Park is a home of endangered, endemic, new record, locally abundant, common and rare orchids.

Diversity of herbaceous angiosperms in mansinagan ridge, almaciga eco park, Davao Oriental

-Gia Alyssa A. Ponferrada [1], Guiller S. Opiso[2] and Jennifer G. Opiso[3]

[1] Central Mindanao University, Musuan, Bukidnon [2] Philippine Eagle Foundation, Baguio District, Malagos, Davao City [3]Biology Department, Central Mindanao University, Musuan, Bukidnon, Philippines [1]janaponferrada@gmail.com; [2]opisogui@gmail.com; and [3]mcgalvz@gmail.com

This study specifically aims to determine the species composition and diversity of herbaceous angiosperms in Almaciga Eco Park. Sampling plots were established across vegetation types and an alpha taxonomy was done from base to ridge of the mountain. A total of 14 families, 20 genera and 31 species were recorded with a total of 1058 individuals. Almaciga Eco Park's herbaceous angiosperms showed Shannon Index of Diversity of H'= 1.272. Emphasizing the vegetation types, montane forest has the highest index of H'= 1.324, followed by dipterocarp forest with H'= 1.118. The result of Shannon Index of Diversity in Almaciga Eco Park and across vegetation types showed low indices. However, species with high importance value include: *Paphiopedilum ciliolare* with 29.25% followed by *Nepenthes petiolata* and *Freycinatia sp.* with 28.92%,, *Scleria scrobiculata* with 24.38%, *Crepidium sp*. with 19.46% and *Dipodium paludosum* with 19.09%. Therefore, these species have strong influence in the ecosystem.

Dispersion pattern of trees in Mansinagan ridge, Almaciga eco park, Davao Oriental

-Aljone C. Montoya [1], Guiller S. Opiso[2] and Jennifer G. Opiso[3]

[1] Central Mindanao University, Musuan, Bukidnon [2] Philippine Eagle Foundation, Baguio District, Malagos, Davao City [3]Biology Department, Central Mindanao University, Musuan, Bukidnon, Philippines [1]aljonemontoya33@gmail.com; [2]opisogui@gmail.com; and [3]mcgalvz@gmail.com

Plant populations exhibit a characteristic spatial dispersion pattern either random, aggregate, or uniform. It is a better measure of how individuals might be utilizing resources or how effective seed dispersal is. The study was conducted to determine the distribution pattern of trees within four 20x20 m sampling plots through GIS-generated map. The dispersion of tree in different vegetation types exhibited drastically different dispersion patterns. Gill (1975) mentioned that an aggregated pattern suggests that the underlying biotic or abiotic environment is divided up into favorable and unfavorable patches. In contrast, a uniform dispersion suggests that some repulsive force prevents individuals from occurring or surviving very close to each other. On the contrary, the observed random dispersion of trees in the plot may be due to the plants that have wind dispersed seeds. To conclude, trees of Almaciga Eco Park, Mansinagan Ridge, Davao Oriental exhibited different dispersion pattern.

Relative protein component of Philippine *Cinnamomum schaeffer* (Lauraceae) by sds-page

Mercedita Aranas - Laurie[1] Victor B. Amoroso[2] and Annabelle P. Villalobos[3]

[1]Mindanao State University- DOS, Maguindanao, (mercylaurie@yahoo.com) [2]Central Mindanao University-Maramag, Bukidnon [3]DOST Balik Scientist

Philippine *Cinnamomum* are trees with aromatic leaves and bark. It has several economic and medicinal uses, but concern on relative protein component are limited. This study was conducted using Sodium Dodecyl Sulfate- Polyacrylamide Gel Electrophoresis (SDS-PAGE). Forty five samples from 27 species were collected from different mountains and places in the country. Results revealed that Philippine *Cinnamomum* leaf samples have the same component proteins. The banding pattern is similar although the intensity of the same bands vary. Pronounced protein bands were observed corresponding to 25kDa, 50kDa and 75 kDa with additional minor bands. The component proteins of *Cinnamomum* leaves were comparable regardless of geographical source and different stages of growth of the samples. Generally, Philippine *Cinnamomum* has high relative protein content which can be used as culinary, medicinal and pharmaceuticals.

Community structure of crabs in the mangroves of Bawbawon Island, Plaridel, Misamis Occidental

Jessa Jhunice Salazar* & Benjo A. Logramonte**

Department of Biology, College of Arts and Sciences Central Mindanao University*sjjessa18@gmail.com, **benjologramonte@yahoo.com

This study assessed the community structure of crabs in Bawbawon Island, Plaridel, Misamis Occidental. Plot sampling and pitfall traps were utilized. Nineteen crab species was documented. Family Ocypodidae was the most abundant and widespread group with 14 species. However, Grapsidae with only three species exhibited great dominance in all study stations. *Perisesarma* sp. had the highest abundance (Pi= 0.352), while *Uca crassipes* and *Uca* sp.2 had a disproportionate number (Pi = 0.00, D= 0). *Thalamitta crenata* and *Thalamita* sp. which are considered commercially important were largely caught in station 3. Stations 1 and 3 were dominated by *Rhizophora mucronata* while Station 3 was dominated by *Sonneratia alba*. The Simpsons Diversity index was high at 0.257. The area had an overlap in its crab community as presented by the Sorenson's Coefficient with 0.47. Variations on the vegetation structure, temperature, inundation and substrate type may have influenced the distribution of crabs

Evaluation of Three Barcoding Loci (ITS, matK, trnH-psbA) on the genus *Ipomoea* L. (Convolvulaceae)

Arlie L. Bamiano[1], Ramon Jose Angelo A. Casipit[1], Peter Kennetth A. Co[1], Dinslee E. Vergara[1], Cecilia Banag[1, 2]

[1]Department of Biological Sciences, College of Science; and [2]Research Center for Natural and Applied Sciences University of Santo Tomas, España Blvd., Manila 1015
Corresponding author: rlybam@gmail.com

The genus *Ipomoea* possesses noted biological activities such as anti-diabetic and anti-cancer properties among others[1]. With *Ipomoea's* undeniable medicinal value, it is crucial to correctly identify its species, to ascertain authenticity. This study provides preliminary data regarding the efficiencies of ITS, *mat*K and *trn*H-*psb*A as DNA barcoding loci of *Ipomoea* on the basis of universality, discriminatory power, and species resolution. Universality assessment of the three barcoding loci showed that *mat*K outperformed the rest exhibiting a 100% PCR and sequencing success rate. ITS showed the highest species-level discrimination, having the highest percentage of variable sites (27.74%) and parsimony-informative sites (23.36%); with a comparatively low mean intra-specific divergence (0.003±0.003). ITS also generated the highest species resolution at 71.43%. The concatenated ITS-*trn*H-*psb*A and ITS-*mat*K showed the same species resolution of 71.43%. Findings of this study emphasize that ITS should be recognized as a core barcode for *Ipomoea* combined with either *mat*K or *trn*H-*psb*A.

Species Richness, Rarity And Endemism Of Wild Orchids Along Elevational Gradient In Mt. Kalatungan Range, Pangantucan, Bukidnon, Philippines

Jessa Marie G. Betanio and Dave P. Buenavista

Central Mindanao University, University Town, Musuan, 8710 Bukidnon, Philippines davista.cmu@gmail.com

The Philippines has approximately 1000-1100 species, yet, ecological studies on country's orchid flora remains to be scanty and poorly studied. Field studies were done using line transect method along elevational gradient from the base to the peak. Results showed the presence of 44 orchid species belonging to 28 genera. Elevational pattern of species followed a double humped-shaped pattern at 1320-1395 masl and 1886-1965 masl. Based on rarity index, 35 (83%) species are very rare, 3 (7%) are sparse, 3 (7%) common and 1 (3%) is common. Moreover, 39 (91%) species of orchids are Philippine endemic with 8 new records. Density of endemism increased as elevation increases which peaked at 1886-1965 masl but declines at 2000 masl. Findings of the study therefore suggest that the elevational pattern of orchid species follows a humped-shaped pattern wherein species richness is highest in the middle of the gradient.

Landmark-Based Geometric Mophometric Analysis on *Nepenthes saranganiensis* Kurata in Relation to the Plant's Trapping Strategies

John Vincent P. Anino II [1] and Dave P. Buenavista[1]

[1]Department of Biology,Central Mindanao University, University Town, Musuan, 8710 Bukidnon, Philippines davista.cmu@gmail.com

This study was conducted to determine the possible trapping strategies of *N. saranganiensis* Kurata through landmark-based geometric morphometric analysis. High-quality photographs of the trap geometry of the plant were taken i.e., the peristome and body shape. Geographical coordinates, elevation, habitat, air temperature, relative humidity, and animal associates were considered to assess the plant's ecological traits. Based from the Relative Warps Analysis, the most variable part of the peristome were the lateral and basal regions including the entire structure of the pitcher from the slippery, transition and digestive zones. Results of histogram distributions showed that the most of population tend to have wider peristomes and body when compared to the shape consensus. Putative functional morphology of *N. saranganiensis* exhibits a prominent and developed slippery zone and narrow peristome in relation to its body size as an adaptation for "Dry Syndrome" trapping strategy as the species specialized in prey retention carnivory.

Molecular confirmation on the synonymy of *Phaeanthus ebracteolatus* and *P. ophthalmicus* including biological activities of its phytochemical constituents

Kristelle Marais A. Bordeos[1], Cyril S. Conciso[1], Jemia Pearl A. Estrada[1], Charton S. Mercado[1], Porferio S. Bangcaya[3] and Grecebio Jonathan D. Alejandro[1], [2]

[1]Department of Biological Sciences, College of Science, [2]Research Center for the Natural and Applied Sciences, University of Santo Tomas, España Blvd., Manila 1015, [3]College of Teacher Education, Biological Science Department, University of Antique, Tibiao Campus, 5707 Antique, Philippines. Email: cyrilconciso@gmail.com, maraisbordeos@gmail.com

Phaeanthus Hook.f & Thomson of the family Annonaceae is a medicinal plant essentially characterized by inner petals that are longer than outer petals, numerous carpels and stamens, and monocarpous fruits [1]. Previous studies have recognized *Phaeanthus ebracteolatus* (Fig. 1) as a synonym of *P. ophthalmicus* based on morphology and type locality [2]. This study aims to (1) verify the synonymy of *P. ebracteolatus* and *P. ophthalmicus* using combined *mat*K and *rbc*L dataset, (2) compute for sequence variations in the two datasets, and (3) explore the phytochemical and biochemical components of the plant. Plant samples were collected in Antique and were subjected to morphological and molecular analyses through DNA extraction, amplification, purification, and sequencing. Crude leaf extracts were subjected to thin layer chromatography and three colorimetric assays, which are α-glucosidase inhibition, anti-tyrosinase and anti-*Staphylococcus.* Results confirm that the two *Phaeanthus* species are conspecific using combined *mat*K and *rbc*L dataset. A minimal computed sequence variation included only 5 bp (0.81%) and 3 bp (0.41%) in *mat*K and *rbc*L regions, respectively. Overlapping morphology also support the finding. The crude leaf extract yielded positive to different antioxidant constituents and demonstrated a high potency in α-glucosidase inhibition indicating its potential use as an anti-diabetic drug.

Nodal Anatomy and Pollen Grain Characterization of Some Philippine Gingers (Alpinioideae: Zingiberaceae)

Ruth C. Alincastre, Florfe M. Acma, Evangeline B. Sinamban and Victoria T. Quimpang

Department of Biology, College of Arts and Sciences Central Mindanao University, University Town, Musuan, 8710, Bukidnon, Philippines flmacma@yahoo.com.ph; 09177018718

Studies on Philippine wild gingers are scanty. Hence, this study described the nodal anatomy and pollen morphology of some Philippine gingers of subfamily Alpinioideae *viz., Amomum muricarpum* Elm., *A. dealbatum* Roxbg., *Etlingera dalican* (Elm.) A.D. Poulsen, *E. philipinense* (Ridl.) R.M. Smith and *Geocharis fusiformis* Ridl. through free-hand sectioning and acetolysis. Anatomical data revealed that the epidermis of the rhizome consisted of tightly packed parenchyma cells. The cortex possesses an inner and outer cylinder which is separated by an endodermoidal layer, a unique tissue of the Zingiberaceae. The pollen grains of the 5 species were circular and psilate. *A. muricarpum* had bigger -sized grains (7-10 µm) while *E. philipinense* and *E. dalican* had the smallest sized pollen grains (5-7µm) among the 5 species. The Bray-Curtis cluster analysis utilizing nodal anatomy and pollen grain characters revealed 3 clusters which confirm the present taxonomic placements of these species.

Diversity of Insect group Neuroptera, Auchenorrhyncha, Lepidoptera and Odonata in Mt. Kiamo and Mt. Malambo, Mindanao, Philippines

Alma B. Mohagan, Dave P. Buenavista, Gloria Galan, Gladys Lynn San Juan and Leonil Jun B. Baguhin

Faculty, Biology Department, Central Mindanao University, Musuan, Bukidnon *almohagan@gmail.com, buenavistadave@yahoo.com,gloriagalan@yahoo.com*

Diversity of selected Insect group Neuroptera, Auchenorrhyncha, Lepidoptera and Odonata was conducted in Mt. Kiamo and Mt. Malambo to give information on species composition and diversity trend of selected entomofauna using Malaisse trap and light trap sampling. A total of 164 species of selected entomofauna recorded in the two mountains. Species level diversity of Mt. Kiamo was 142 species H'1.8) and Mt. Malambo (70 species H'1.186). Two (2) were neuropteran: one for both mountains, 28 butterflies & 74 moths for Lepidoptera, 25 were odonata and 26 auchenorrhyncha. There was higher species composition and diversity level in lower elevation (Agroecosystem 120 species & H' 1.65), lower diversity was observed in higher elevation (Mossy 36 , H' 1.302 & 12 H' 0.795 species only). The result suggests utmost conservation action of the remaining habitats for rare and endemic species.

Diversity And Local Status Of Moths In Mt. Musuan, Maramag, Bukidnon

KerkRekkem G.Rafil[1] and Joliesa Mae S. Toledo[2]

Central Mindanao University, Musuan, Bukidnon[1,2] joliesamaetoledo@gmail.com[2]

The study was conducted to determine the diversity of moths and assess the local status of moth species found in Mt. Musuan, Maramag, Bukidnon. The study was done using light trap on three vegetation types of Mt. Musuan. The study revealed a total of 47 species belonging to 8 families and 27 genera and 19 unidentified species. Shannon-Weiner index of diversity showed H'= 1.612 in mixed dipterocarp, H'= 1.395 in grassland and H'= 1.561 in pine tree vegetation. Based on Kruger scale of insect diversity mixed dipterocarp is considered as fair level of moth diversity while both grassland and pine tree vegetation is considered as low level of moth diversity. Assessment of local status of moth revealed 2 species are very common, 13 species are common, 25 species are rare and 7 species are very rare. Therefore, among the three vegetation types in Mt. Musuan, mixed dipterocarp has fair moth diversity. Local status of moth revealed more rare species of moths in Mt. Musuan.

Species Level Assessment of Freshwater Crabs in Mindoro with Special Reference to Baroc River Catchment, Roxas, Oriental Mindoro

Alfredo P. Carpio Jr.

Ateneo de Manila University School of Science and Engineering Department of Biology, Katipunan Avenue, Loyola Heights Quezon City, Philippines 1108
Email: alfredo_carpio9@yahoo.com

This study aims to gain knowledge in species composition and taxonomy of freshwater crabs in Mindoro with concentration in Baroc River catchment in Roxas, Oriental Mindoro for their zonation patterns along longitudinal stream courses and altitudinal gradient. Characteristic microhabitat was observed for the different freshwater crabs collected. Four species were sampled from the site namely *Mindoron pala* NG & TAKEDA, 1993, *Parathelphusa mindoro* NG & TAKEDA, 1993, *Labuanium trapezoideum* H. MILNE EDWARDS, 1837, and *Sundathelphusa* sp. nov. Among the four species sampled from the site one was found to be a new species. The study includes diagnosis of the specimen [with details on carapace margin, gonopods, pleopod (except male G1 and G2), third maxillipede, and mouthparts], diagnosis of the specimen and notes on distribution and habitat. After examining existing collections of freshwater crabs from Mindoro, another specimen was also found to be a new species of *Geosesarma.* Description of this new species was also included in this study besides those collected from the study site.

New Faunistic And Host Record Of *Phauda Flammans* Walker (Lepidoptera: Zygaenidae) From The Philippines

Elliaj Kaye Capacete[1], Alice Geraldine Hernando[1], Richard Lagrimas[1], Jalizah Jaira Lim[1], Sharlaine Orense[1], Joan Rivera[1], Gerald Soliven[1], Michael Tabug[1] And Aimee Lynn Dupo[1, 2]

[1]University of Santo Tomas Graduate School, Thomas Aquinas Research Complex Espana, Manila Institute of Biological Sciences and [2]Museum of Natural History, University of the Philippines, Los Banos, College, Laguna; abdupo@up.edu.ph

In early April 2016, a number of slug-like caterpillars defoliated *Ficus benjamina* trees in Los Baños Laguna. Rearing of larvae to adult revealed that the identity of the species was *Phauda flammans* Walker 1954. Report of occurrence of this species is a new country record. In addition, the host plant, *Ficus benjamina* is also a new host plant record for *P. flammans*. Lastly, morphological descriptions of the last larval instar of this species are provided.

DNA barcoding can identify plastic variants of blowfly species: *Chrysomya megacephala*, *Chrysomya ruffifacies*, and *Hemipyrellia ligurriens* (Diptera: Calliphoridae)

Ronniel D. Pedales& Ian Kendrich C. Fontanilla

DNA Barcoding Laboratory, Institute of Biology Natural Science Research Institute, College of Science University of the Philippines—Diliman, Quezon City ronnipedals@gmail.com

Accurate identification of blowflies is important in forensic investigations. Urban flies were collected in the University of the Philippines—Diliman campus using porcine liver as bait. Initial identification of 1250 blowflies yielded eight morphospecies belonging to subfamilies Chrysomyinae (5) and Calliphorinae (3). 28 flies were subjected to DNA barcoding using the COI gene. After BLAST, samples were identified as *Chrysomya megacephala*, *C. ruffifacies,* and *Hemipyrellia ligurriens*. From the samples, two (2) morphs of *C. megacephala*, three (3) of *C. ruffifacies,* and three (3) of *H. ligguriens* were identified. Flies varied in size especially for *C. megacephala and H. ligguriens*, which could be explained by high competition pressures experienced by their larval forms. *C. ruffifacies* also had size variants including a morph (4 specimens) with a fuscous, setulose lower calypter, a taxonomic character for blowflies. Complementing morphological identification with molecular data is recommended for further studies on the taxon.

Pathogenicity Test Of Isolated Fungal Strains From Sugarcane To *Cyperus Rotundus*(Nut Grass)

[1,2]Ramon Angelo C.Bayani, [1,2]Karen Andrea D.Cadacio, [1,2]Justine Louise B.Casipit, [1,2]Michelle Angelica D.Choa, [1,2]Anna Christina R. Ngo, [2]Niño Andree Louis E. Caguimbal and [1,2] Gina R. Dedeles

[1]Department of Biological Sciences, College of Science and [2]Research Center for the Natural and Applied Sciences, Thomas Aquinas Research Complex, University of Santo Tomas, España, Manila 1015 Philippines

This research study aimed to isolate the fungal strains found in the necrotic leaves of sugarcane at a plantation in Luisita, Tarlac and to study their pathogenicity to nut grass and sugarcane crops. Fungal symptoms such as necrotic leaves and striped discolorations were observed on leaves of sugarcane. Nut grass, characterized as being very invasive, has been known to grow in different areas around sugarcane crops and has been therefore presumed to be the source of infection found among sugarcane.Leaf pieces of sugarcane with necrotic lesions were cut and surface-disinfected with disinfectant solution and distilled water. These leaves were placed on a one-fourth strength PDA for the isolation of fungal strains. Pure fungal isolates were then tested for Koch's postulates to determine the causal relationship of the pathogen and the disease. From the isolated fungal pathogens, *Fusarium* sp. (1), *Curvularia* spp. (3), *Nigrospora* and *Aspergillus* spp/, (1 each) were purified and identified as well. *Nigrospora* and *Fusarium* spp. were both positive for pathogenicity in sugarcane and nutgrass while *Aspergillus* sp. was non-pathogenic. *Curvularia* sp. was negative for pathogenicity on nutgrassbut positive on sugarcane. With this, nut grass therefore could be a temporary host of fungal pathogens in a sugarcane plantation.

Identification and Pathogenicity Tests of Foliar Fungi in *Saccharum officinarum* (Sugarcane)

[1,2]Rotelle S.Adelan, [1,2]Adrian Joseph M. Borommeo,[1,2]Amarjet B. Singh, [2]Justin Paolo B. Abengañ and[1, 2] Gina R. Dedeles

[1]Department of Biological Sciences, College of Science, and [2]Research Center for the Natural and Applied Sciences, Thomas Aquinas Research Complex, University of Santo Tomas, Espana, Manila 1015 Philippines

Sugarcane, *Saccharum officinarum*, is a perennial grass in the family Poaceae. The Poaceae are the most economically important plant family, providing staple foods from domesticated cereal crops such as corn, wheat, rice, barley and most of all the sugarcane which are grown for its stem (cane) primarily used for sugar production. This crop is mainly infected by fungal diseases which could result in reduced production yield. Hence, this study was conducted to know and identify the different foliar fungi present on sugarcane plants from three selected provinces in the country in order to assess the pathogenicity of each fungus to the host plant. One hundred fifty infected leaf samples from the sugarcane plantations in Bukidnon, Ilagan City, Isabela and Luisita, Tarlac were randomly collected. The infected parts of *S. officinarum* leaves were plated on a 1/4 strength Sobaraud Dextrose Agar and on moist chamber, then, all emergent fungi were isolated, purified, and identified. Koch's postulates were established to assess the pathogenicity of each fungal isolates. Altogether, twelve fungi comprising of nine genera namely, *Aspergillus, Bipolaris,Chaetomium, Curvularia, Drechslera, Fusarium, Nigrospora, Paecilomyces,* and *Trichoderma* spp. were isolated. Of these twelve species, three were *Curvularia* species and two were *Fusarium* species. However, from the pathogenicity test conducted, only four genera*, Bipolaris, Curvularia, Drechslera and Fusarium spp.* were found to be pathogenic. From the results gathered, it was found out that not all fungi present on the leaves of *S. officinarum* were pathogenic.

Dna Barcoding Reveals Fraud In The Philippine Vitex Negundo L. (Lagundi) Trade: A Call For A Quality Control Protocol To Ensure Consumer Health

Maximo T. Umali IV[1], Joanner Paulus Erik P. Alaba[1], Jose Francisco M. Atienza[1], Jerick Jeffrey S. Tan[1], Jay Edneil C. Olivar[2] & Grecebio Jonathan D. Alejandro[1,2]

[1]Department of Biological Sciences, College of Science, [2]Research Center for the Natural and Applied Sciences, University of Santo Tomas, España, Manila 1015
Maximoumali.iv@gmail.com

DNA barcoding has gained attention in product quality control due to its efficiency in species authentication. Its application in plant-based materials, however, has been slow due to the (1) lack of standard DNA barcoding loci in plants and (2) poor DNA yield from powderized plant products. This study reports the successful application of DNA barcoding in the authentication of five *Vitex negundo* herbal products sold in the Philippines. The first standard reference material (SRM) herbal barcode library for the recognition of authentic *V. negundo* samples was established using 42 gene accessions of ITS, *psb*A-*trn*H, and *mat*K barcoding loci. Herbal product authentication utilized the SRM following the BLASTn and Maximum-likelihood (ML) tree criteria. Barcode sequences were retrieved for ITS and *psb*A-*trn*H of all products tested and results revealed that only one out of five herbal products satisfied both BLASTn and ML tree criteria, and was considered to contain authentic *V. negundo*.

A multigene analysis of the phylogenetic position of the Philippine endemic *Gloeocarpus* Radlk. (Cupanieae, Sapindaceae)

Axel H. Arriola[1] and Grecebio Jonathan D. Alejandro[2]

[1]Department of Biological Sciences, College of Arts and Sciences, University of the East, 2219 C.M. Recto Ave, Manila. [2]Research Center for the Natural and Applied Science, The Graduate School and College of Science, University of Santo Tomas, Espana, Manila

The genus *Gloeocarpus* Radlk. was established to accommodate the Philippine *Cupaniopsis patentivalvis* Radlk. This monotypic genus is endemic in the Philippines and can only be found in the provinces of Laguna and Quezon. *Gloeocarpus*is monophyletic based on the previous phylogenies, conversely it was only assessed utilizing the internal transcribed spacer (ITS). However, with the availability of more gene markers, it is necessary to challenge the generic status of the genus because increasing the gene number irrespective of the taxa used may be a prerequisite for improving phylogenetic accuracy. In this current study the ITS, matK, and rbcL sequences of Gloeocarpus were aligned with the currently available sequences from the GenBank. Phylogenetic tree recovered from Bayesian inference analysis and Parsimony analysis revealed a robustly supported family of Sapindaceae (PP=1.00; BS=100%). Meanwhile, Gloeocarpus nested within the strongly supported Cupania clade (PP=1.00; BS=100%) and is monophyletic. Morphological features of *Gloeocarpus* such as the presence of hairy petals with slight folded margins and sinuate branchlets supports our molecular results.

A Multigene phylogenetic analysis of selected Philippine *Psychotria* L (Rubiaceae) and a description of two new species.

John Paul S. Domingo[1], Ryonne T. Solon[1], Carlo Orga[1], Grecebio Jonathan D. Alejandro[2] and Axel H. Arriola[1]
[1]Department of Biological Sciences, College of Arts and Sciences, University of the East, Manila. [2]Research Center for the Natural and Applied Sciences, The Graduate School and College of Science, University of Santo Tomas, Espana, Manila

Psychotria is considered to be one of the most specious genus in Rubiaceae. Previous taxonomic treatment of *Psychotria* revealed the group to be polyphyletic until the recent molecular works that widened its circumscription and revealed a strong support on the African, Pacific, Australasian and the New world clades. Unfortunately no Philippine representatives were included in these phylogenetic works. Thus, as part of the continuing effort in Philippine Rubiaceae, several species of *Psychotria* were collected in various forested regions of the Philippines (Quezon and Rizal). In this present study the rps16, trnT-F, rbcL (cpDNA) and ITS (nrDNA) of *P. tayabensis*, *P. cuernosensis* and two diverging species of *Psychotria* were amplified, sequenced and aligned with the sequences of related species to determine their phylogenetic position. Majority-rule consensus tree of the combined rps16-trnT-F-rbcL-ITS datasets showed a well-supported (PP=1.00;BS=100%) clade of the whole Psychotrieae and *Psychotria* (PP=0.90; BS=90%). Interestingly, the Philippine *Psychotria* included in our sample nested within the Afro-Asian-WIOR-New World clade with strong support (PP=0.60; BS=85%). Meanwhile, meticulous observation of our two sampled *Psychotria* revealed no exact match with the currently recognized species of the genus, thus two new species is herein proposed, *P. pillosa* Domingo, Orga and Arriola and *P. rizalensis* Domingo, Alejandro and Arriola.

Dispersal or Vicariance: Inferences on biogeographical histories of the Philippine Octotropideae (Rubiaceae) inferred from cpDNA sequences

Elaine Grace Espinosa[1], Kevin John Albano[1], Deborah Angad[1], ArnelPelayo, Grecebio Jonathan D. Alejandro[2] and Axel H. Arriola[1]
Department of Biological Sciences, College of Arts and Sciences, University of the East, 2219 C.M. Recto Ave, Manila[1]. Research Center for the Natural and Applied Science, The Graduate School and College of Science, University of Santo Tomas, Espana, Manila[2]

The tribe Octotropideae (Rubiaceae) comprises of more than 50 described species in tropical Africa, Madagascar and Asia. In the Philippines, the tribe is represented by two genera *Hypobathrum* (3 species) and *Villaria* (6 species). The group is considered to be undertreated due to the lack of information regarding its phylogeny, taxonomy and biogeography. Therefore this study aims to provide inferences by reconstructing the biogeographical history of the Philippine representative utilizing multiple cpDNA sequences (accd-psa1, petD, rpl16 and trnLF) which will be significant in bridging the gap of much needed information for the tribe Octotropideae. A total of 57 taxa were aligned (downloaded from the GenBank as well as unpublished sequences) and were analyzed using the Recent Ancestral State Phylogeny (RASP) software. The result of both S-DIVA and BBM suggests that the Philippine Octotropideae originated from an African ancestry with several dispersal and vicariance event from Africa to Asia and is robustly supported [PP=0.97 (S-DIVA) and PP=0.87 (BBM)]. Strongly supported by clades with high supports, biogeographical analysis suggests that Africa played a vital role as a center of diversification and radiation of the Philippine Octotropideae and the whole tribe.

Isolation, Characterization and Identification of Fungal Endophytes from the Leaves of the Mangrove *Avicennia* sp.

Ace Bryan Cabal,Schola Marie Zapanta

Adamson University, San Marcelino, Manila, Philippines abscabal@adamson.edu.ph; schola.marie.zapanta@adamson.edu.ph

Endophytes are organisms that colonize plant tissues without causing disease to their host plant. These organisms are plants' natural symbionts which are responsible for the growth of their plant host as well the production of different compounds. In this study, a mangrove species, *Avicennia sp*. was screened and studied for the presence of fungal endophytes. The fungal endophytes were isolated from the leaves of *Avicennia sp*. collected from Las Piñas – Parañaque Critical Habitat and Ecotourism Area (LPPCHEA). The study used phenotypic, molecular, and phylogenetic methods in the identification and classification of the fungal isolates. One species of fungal endophyte was isolated, characterized and identified from the leaves of *Avicennia sp*. which is *Penicillum solitum*. Furthermore, the results were acceptable since phylogenetic analysis showed a high number of confidence level in a 1000 bootstrap value. Further studies are warranted to determine the biotechnological and pharmaceutical potential of the identified endophytes.

An Inventory of Rubiaceae in Balangkayan, Eastern Samar Including a Phytochemical Screening and a Preliminary Report on the Cytotoxic Activity of *Neonauclea formicaria* (Elmer) Merr.

Jaydan I. Aguilar[1], Joanna Domini T. Bernardino[1], Miguel Lawrence F. Sta. Maria[1], Jenica Nicole S.J. Yu[1] and Cecilia I. Banag[1,2]

[1]Department of Biological Sciences, College of Science; and [2]Research Center for Natural and Applied Sciences University of Santo Tomas, España Blvd., Manila 1015
Corresponding author: bernardinonikki@gmail.com

Rubiaceae encompasses one of the largest numbers of angiosperms in the Philippines[1]. Its largely untreated taxa provide difficulty to completely document its biodiversity and economic significance. In light of this, the study provides an inventory of Rubiaceae in two sites in Balangkayan Eastern Samar, including phytochemical screening and preliminary report on cytotoxic activity of *Neonauclea formicaria* (Elmer) Merr. against colorectal cancer cells. Inventory of the sites identified 43 individual plant taxa representing approximately 25 species, with 8 endemic representatives, belonging to 17 genera. Among the endemic species, *Greeniopsis discolor* Merr. and *Antherostele grandistipula* (Merr.) Bremek. fall under the category of Other Wildlife species and Vulnerable species respectively by DENR[2]. Phytochemical screening of *N. formicaria* revealed the presence of alkaloids and triterpenes, which harbor antitumor activities. Results from the MTT (3-(4,5-dimethylethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay demonstrated a moderate cytotoxic effect of *N. formicaria* against colorectal cancer cells, with peak cytotoxic activity at 12.5µg/mL.

Taxonomy And Distribution Of Wild Gingers (Zingiberaceae) In Mt. Nabukalan, Kalatungan Mountain Range, Bukidnon, Mindanao, Philippines

Mark Arcebal K. Naive

Central Mindanao University, Musuan, Bukidnon Corresponding author: arciinaive19@gmail.com

This study was conducted to determine the species richness and distribution of the Zingiberaceae species in Mt. Nabukalan, Kalatungan Mountain Range, Pangantucan, Bukidnon. Transect walk from the foot to the summit of the mountain and opportunistic sampling were done. The study revealed 12 species namely: *Alpinia alpina*, *Alpinia* cf. *flabellata, Alpinia haenkei*, *Etlingera* cf. *alba*, *Etlingera pandanicarpa*, *Etlingera* cf. *philippinensis*, *Etlingera* sp. 1, *Etlingera* sp. 2, *Globba campsophylla*, *Hornstedtia* sp. 1, *Zingiber banahaoense* and *Zingiber* sp. 1 which represents 36% of the total 14 genera and 11% of the 107 species found in the Philippines. The distribution of the species revealed that Zingiberaceae dwells from 1300-1900 m asl and that species grow clumped but genera were generally scattered. Morphological characters such as its leaves, inflorescence and infructescence were found to be of taxonomic significance.

Cryptic Speciation Of *Monopterus albus* Collected From Central Luzon, Philippines

Esperanza I. Arcilla and Joel M. Chavez

Far Eastern University-Manila Corresponding author: espiearcilla@gmail.com

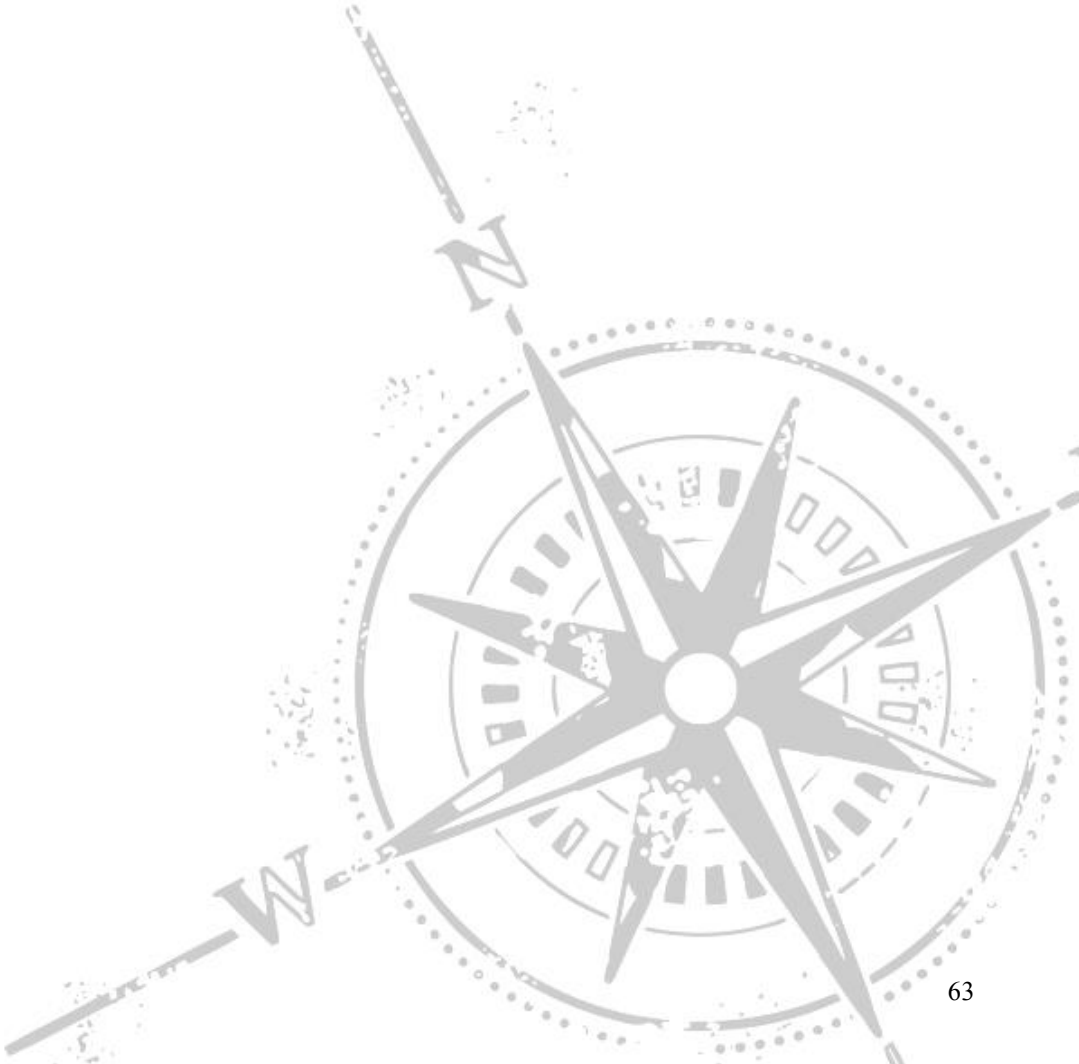
*Monopterus alb*us or locally known as igat or kiwet was found in the Northern part of the Philippines. The study aimed to establish the identity of *Monopterus albus* through morphology and DNA barcodes. Based on its morphology, the 128 samples were identified as *M. albus*. From 33 morphological characters, two characteristics were strongly linked to *M. albus*. The characteristics are: precaudal vertebrae 89-100 and presence of 2 rows (biserial) palatine teeth and single row (uniserial) mandibular teeth. The NJ and ML generated using COI as genetic marker showed that all putative *M. albus* collected from Central Luzon were found to cluster in one clade. The TCS software has generated seven haplotypes from putative *M. albus* species in Central Luzon. Further, it shows that *M. albus* collected from Central Luzon were all cryptic species. Therefore, a higher resolution should be used in order to establish the identity of *M. albus*.

DNA Barcoding and Molecular Phylogeny of the Philippine *Mycetia* Reinw. (Rubiaceae) including an account of a new species from Agusan del Norte, *Mycetia dagohoyi*

Ulpiano P. de la Bajan Jr.[1], Jorge Anton D. Ordas[1], and Grecebio Jonathan D. Alejandro[1,2,3]

[1]The Graduate School, [2]College of Science and [3]Research Center for the Natural and Applied Sciences, University of Santo Tomas, Espana, Manila 1015 Philippines
Corresponding authors*: jundelabajan@gmail.com, balejan@yahoo.com*

The Philippines has four species of *Mycetia*Reinw. (Rubiaceae), *M. cauliflora, M. javanica, M. mindanaensis* and *M. apoensis* with the later two recognized as endemics and new combinations from *Adenosacme* Wall. Currently, the taxonomy and phylogeny of the *Mycetia* are imperfectly known. Several specimens were collected from Negros Oriental, Camarines Sur, Batanes, Agusan del Norte, Surigao, Camiguin and Davao. These were subjected to morphological and molecular assessments using six DNA markers: *rps16, trnL-F*, ITS, *matK, rbcL* and *trnH-psbA*. Bayesian analyses showed that *M. cauliflora* and *M. apoensis* are sister-taxa while *M. mindanaensis* belongs to a separate clade from *M. javanica*. Morphological data showed that they are distinct from each other. Interestingly, a species from Agusan del Norte differs in morphology and showed divergence with a high support and is hereby proposed as a new species, *Mycetia dagohoyi*. In addition, the performance of the markers was assessed in terms of universality and discriminatory power through a barcoding analyses. Based from the results, the combined *rps16, trnL-F* and *trnH-psbA*is the best barcode set to study the genus *Mycetia.*



Workshop Sessions

Workshop 1

Biodiversity of Micro- and Macroalgae in Freshwater and Marine Environments

Susana F. Baldia[1,2,3], Paciente A. Cordero Jr.[2,4,5,], Kelsey Ann Sambitan[2], Ken Joseph Clemente[2], and Cecilia Cordero[2]

[1]College of Science, [2]Graduate School, [3]Research Center for the Natural and Applied Sciences, University of Santo Tomas [4]Visayas State University at Tolosa, Leyte, [5]Eastern Visayas State University, Burauen Campus, Burauen, Leyte

Workshop 2

Starting a voucjer specimen collection for the parasites of Philippine Fauna

Jonthan Carlo Briones

College of Science, Graduate School, Research Center for the Natural and Applied Sciences, University of Santo Tomas

Workshop 3

Techniques in plant molecular phylogenetics

Thomasian Angiosperm Phylogeny and Barcoding Group

Research Center for the Natural and Applied Sciences, University of Santo Tomas

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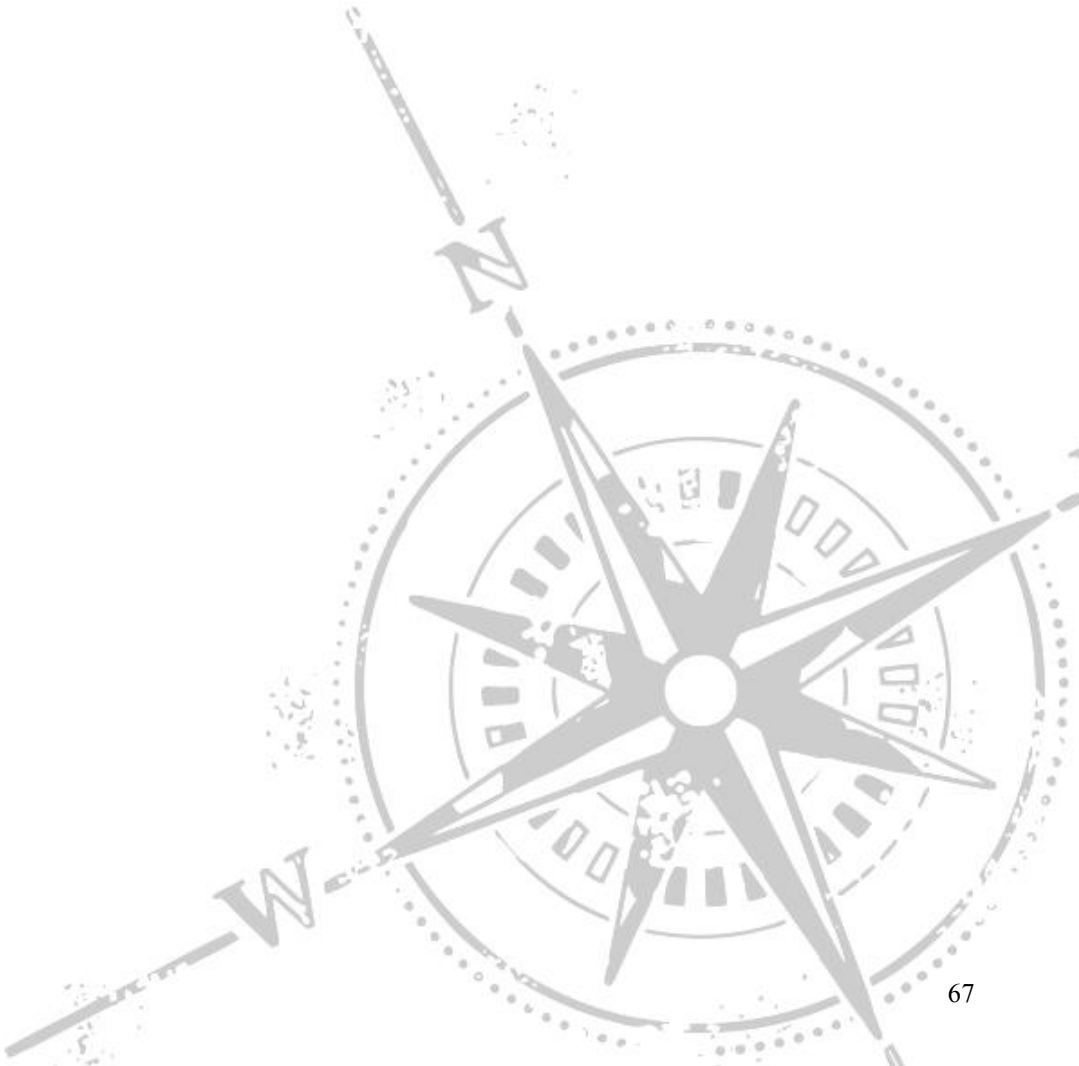

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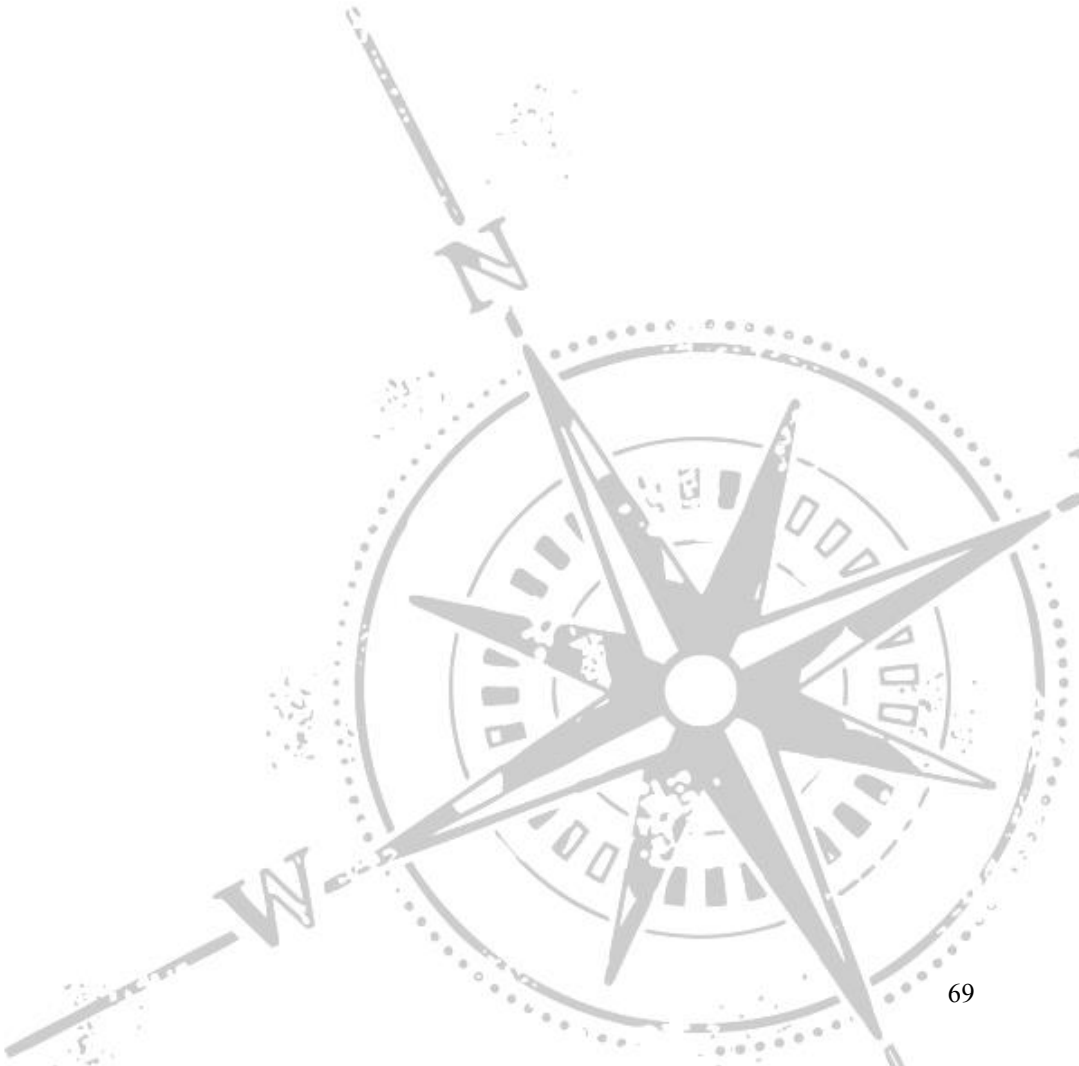

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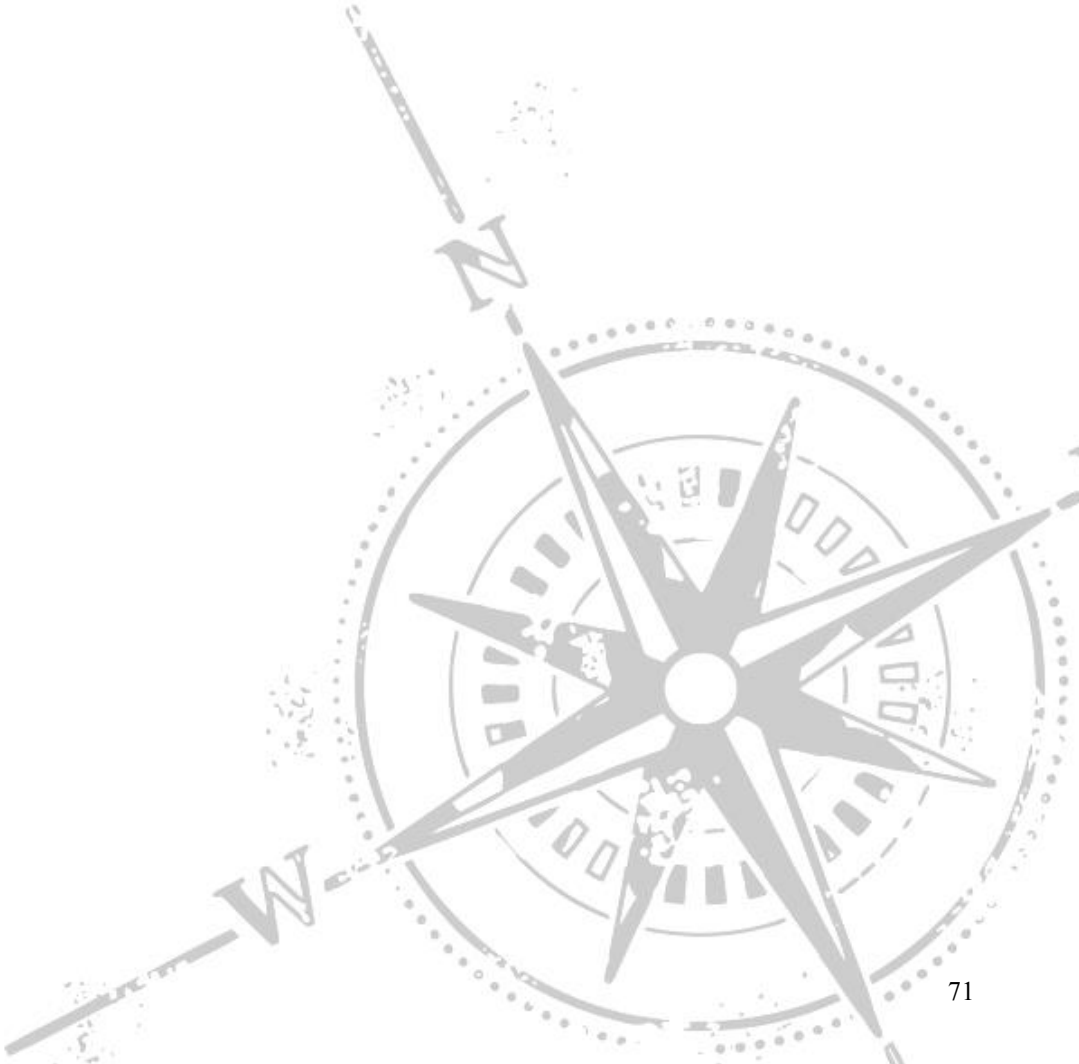
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