The Mouseion

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MNS FEATURES DOLPHINS, WHALES AND DUGONG

By S. S. Santander

The UPV Museum of Natural Sciences opened an exhibit entitled, "The amazing marine mammals" last June 30, 2009 at the Museum lobby, Library building.

According to the publication "Marine Mammal Stranding Response Manual", edited by L.V. Aragones and G.E. Laule, the Philippine waters host a total of 31 species of dolphins, whales and dugong. But these population of mammals are threatened to decline due to various human activities. Despite its huge size, marine mammals are threatened by chemical and physical pollution, habitat destruction, noise pollution, direct and indirect fisheries and many other human activities such as unregulated ecotourism.

Posters on the biology of marine mammals, threats, laws and other agreements concerning the animals were featured while the preserved specimens of dolphins and whales served as the main attraction of the exhibit. Added to these, a film show was enjoyed by the visitors during the opening week of the exhibit.

Students from local high schools in Miagao take a look at the marine mammal exhibit

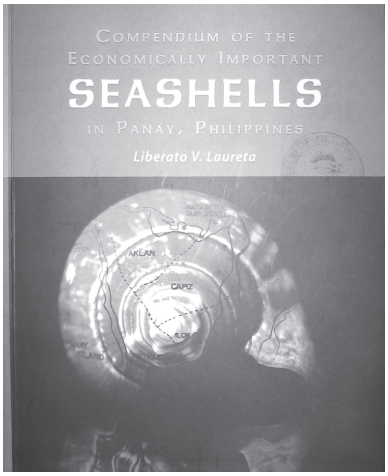
MNS believes that this activity will in one way or another help educate the students and other visitors on the marvels and importance of another amazing aquatic creature.

LAURETA DONATES BOOK ON SEASHELLS

By S. S. Santander

Dr. Liberato V. Laureta donated his book, "Compendium of the Economically Important Seashells in Panay, Philippines" to UPV Museum of Natural Sciences last June 2008.

The book is a vivid and informative encyclopedia of seashells in the natural world. It contains more than 300 photographs in full color with comprehensive and concise accounts of the different species, making this publication a must-have book for all students and researchers working on seashells.



The donation of this book is a big contribution to the limited references of UPV-MNS on malacological taxonomy of the Philippine specimens.

HIKARI Man Gives Pearl Oyster Shell

By S. S. Garibay

The considered largest and most solid of all pearl shells, the Gold Lipped Pearl Shell is now a part of the museum collection. Mr. Agustin R. Badon II, Senior Research Manager of HIKARI SSP Corp. Pearl Culture Farm donated two pairs of *Pinctada maxima* shells last April 2009.

The *Pinctada maxima* (Gold Lipped Pearl Shell), locally known as "tipay" is the species that is being used for pearl farming in the Philippines. This shell commonly attached to rocks and other hard substrates at depths up to 30 m. It can be found in Panay islands, Puerto Galera, Oriental Mindoro and some part of the Indo-Pacific Region. Other species under the genus Pinctada include the species margaritifera and fucata. Aside from its main use for pearl culture, these shell species are also utilized as raw materials in making buttons and other decorative accessories in shellcraft industries.

Mr. Badon gave the shell after his lecture on the "Pearl Industry in the Philippines" during the College of Fisheries and Ocean Sciences graduate student's activity, wherein, the donated Pinctada was used as a sample.

A New Look at our Little Green Friends

By Victor Marco Emmanuel Ferriols, CFOS-IA

Have you ever imagined being able to discover and name your very own species? With the Philippines being one of the world's hotspots for aquatic biodiversity, this possibility isn't far from being a reality. Just recently, surveying expeditions conducted by both foreign and local scientists have resulted to the discovery of hundreds of new species of aquatic flora and fauna within our very own waters. With that being said, you might wonder what kinds of plants and animals could there still possibly be waiting to be discovered?

One particular group of plants just might give you that opportunity. They come in a myriad of sizes ranging from tiny unicellular forms to large macrophytes as tall as a three-storey house. This group of organisms is one of the oldest on the face of the planet and the numbers of species out there are in the tens of thousands already. They have a hundred and one uses for humans from food, pharmaceuticals, and even cleaner alternative fuels. If you guessed it right, there's only one group of plants that would be on your mind right now…the Algae!

So now comes the question, if there are already tens of thousands of species of algae out there how could there still be room for more discoveries? Well, thanks to scientific advances in genetics over the past few decades, we now have tools to identify and classify new and existing organisms not only based on their morphology but on a deeper and more accurate level…their genetic make up. Molecular taxonomy, as it is more able commonly known, is a modern branch of taxonomy that deals with the classification of organisms based on their genetic data from DNA and proteins. It gives us a more accurate picture of how one particular species is related to another across space and time. It has even been used to reclassify certain organisms under one family or genus into a different one since, although they may be morphologically similar, their genetic data would show otherwise.

Now going back to our algae. Try taking a drop of sea or pond water and observing it under the microscope. You'd probably spot close to a dozen or even more species of microalgae in that single drop. Now look at it on a larger scale. You've got 70% of the world covered in water to explore trying to find new species of algae! A lot of these algae may look the same (including the larger forms) but a closer look at their genetic information could give you the key to a new discovery. Small differences in the sequence of nucleotides could mean huge variations in biodiversity.

So why bother going through all the trouble of trying to find new species to name a new organism, discovering new species could lead to scientific breakthroughs in terms of their potential applications. Yet undiscovered algal species could have the potential to produce better quality carrageenan for pharmaceuticals, higher oil yields for biodiesel, or better nutrients for food. Aside from the variety of useful compounds that the new and existing algal species can offer, studying algae using molecular techniques could also be used to picture out how different aquatic habitats could be possibly linked together by water currents. This could later on help policy makers in formulating better management strategies, not only for one particular area but for a web of interconnected aquatic ecosystems. It could also be used to identify causative agents for the ever persistent harmful algal blooms (collectively known as red tides) in our country.

With this in mind, who could now say that algae are boring? So get the plankton net, put on the goggles, and warm up the PCR machine. Its time to discover something new!

Phylogenetics from page 3...

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PHYLOGENETICS:

Understanding the Network of Life

By Carlo C. Lazado
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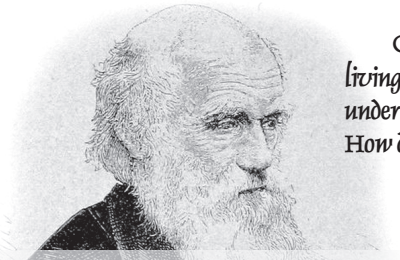

Genome science is evolving into a holistic field of research in the past years. It provides niche for understanding living organisms' past, present and future. Perhaps the area of biology to benefit most from genome sequences is our understanding of evolution. Genomes provide missing links to answer these questions – What is the origin of life? How did the nucleus of eukaryotic cells evolve? What is the origin of human beings? (Campbell and Heyer, 2006)

Computer science, an area initially not within the scope of biology, shapes different things on how we analyze and interpret species diversity. It has given birth to an interdisciplinary research area called bioinformatics, which elucidate some gray areas of evolution. Bioinformatics involves the technology that uses computers for storage, retrieval, manipulation and distribution of information related to biological macromolecules such as DNA, RNA and proteins (Xiong, 2006). One of the research fields under this broad area is phylogenetics which has been one of the best research tools in understanding the evolutionary history of living organisms. The main premise of this field is that, mutations on the genetic material affect biological diversity thus evolutionary information can be derived by analyzing these biological data through bioinformatics tools.

PHYLOGENETICS - A SCIENCE

Phylogenetics is the study of evolutionary history of living organisms using tree-like diagrams to represent pedigrees of these organisms (Xiong, 2006). The term phylogenetics is of Greek origin from the terms phyle/phylon meaning "tribe, race," and genetikos, meaning "relative to birth" from genesis (www.wikipedia.com). The tree branching patterns representing the evolutionary divergence are referred to as phylogeny. When Darwin described the evolution of life, he used the metaphor of a tree with a trunk giving rise to complex branching as new species evolved (Campbell and Heyer, 2006).

FOSSIL RECORDS OR MOLECULAR DATA?

Phylogenetics can be studied in two ways, either by using fossil records or molecular data. The use of fossil records which contain morphological information about ancestors can be fragmentary and their collection is often limited by abundance, habitat, geographic range and other factors making them less favourable for phylogenetic studies. Normal and unwanted mutations within organisms are accumulated in the genes that can be translated to be a good medium to serve as molecular fossil. Evolutionary history of the genes and even the organism itself can be revealed through comparative analysis of these molecular fossils. The main leverages of using molecular data are its abundance and ease to obtain when compared with fossil records.

MOLECULAR MARKERS - NUCLEOTIDE OR PROTEIN SEQUENCES

The first step of molecular phylogenetic tree construction is choosing appropriate molecular markers - nucleotide sequences or protein sequences? The decision on which sequences to be used depends on the properties of the sequences and purpose of the study. Nucleotide sequences are often used for studying closely related organisms. However, if you want to delineate phylogenetic relationship at the deepest level just like between bacteria and eukaryotes, the use of protein sequences is more advantageous since they are relatively more conserved.

PHYLOGENETIC TREE

Phylogenetic trees are a convenient way of visually representing the evolutionary history of life (Theobald, 2004). A phylogenetic tree is a graphical representation of different species diversions through time. Just like a living tree, it has roots, branches and leaves which play an important role in understanding relationships within taxon or between different taxa. A phylogenetic tree can be rooted or unrooted. The root of the tree shows the common ancestor of all species or taxa shown in the tree. Unrooted tree shows only positional relationships. The braches represent genetic relationship and at the tip of which can be found the present-day species or sequences known as taxa or operational taxonomic units. The node that connects two adjacent branches represents an inferred ancestor of extant taxa. With the use of nucleotide or protein sequences, phylogenetic tree can be reconstructed through distance-based methods (eg. neighbor-joining, UPGMA) or character-based methods (eg. maximum likelihood, maximum paximony) depending on how similar the sequences are. There are several bioinformatics tools available for reconstructing phylogeny: PAUP (Phylogenetic Analysis Using Parsimony), Phylip (Phylogenetic Inference Package), TREE-PUZZLE, PHYML and MEGA4. These softwares are freely available in the internet.

Thus, using phylogenetics in understanding the network of the evolution of life helps us in explicating some questions that confounded us. Are we really closely related to chimpanzees? The origins of modern humans - out of Africa or not? Does the virulence of *Vibrio harveyii* in the Philippines similar to the one isolated in Thailand? How much gene flow is there among local populations of "bangus" in Iloilo?

Evolution is not a new science. However, the expansion of new areas to elucidate the evolution of living organisms through the ever rapid developments in genome science and computer science has given warranted inputs to the old science of evolution. These technologies are developed to help us analyze not just our roots but as well as other organisms, up to the point of understanding the global relationships underlying within. As Charles Darwin turns 200 years old this year, he might be very happy that the concept that he had laid down evolved into a broad science and gave birth to phylogenetics in understanding the complicated but exciting network of life.

Phylogenetics see page 2...

Getting to know...

THE GIANT ISOPOD

By Edna P. Abunal, CFOS-IMFO

Are you familiar with isopods? The isopods are not known to be commercially exploited from the deep water of the Philippines. No published information is available regarding the fishery of giant isopod in Philippine waters perhaps due to paucity of catches that may not caught interest to most commercial fisheries. However, there is one species caught in the inner shelf of Davao Gulf identified as *Bopyroides hypolites.*

The *Bopyroides hypolites* species is said to have white meat and similar texture as that of crabs and lobster. While it was identified under the genus Bopyroides, there is still a need to study further its characteristics because of its similarities to genus "Bathynomus" which is the largest known member of isopod.

The isopods are considered as one of the largest orders of marine crustacea with over 10,000 species ranging from 5-15 mm to a small as 0.5 mm. They are found in a wide range of habitats from freshwater to marine and terrestial habitat. Almost half of these species are said to live in shallow coastline waters and the deep sea. The freshwater one inhabits burrows they make on sediments and in vegetation.

Most of them are omnivorous, eating everything from living to dead organisms and vegetation to fungi. The marine species feed on algae, diatoms and other vegetation or vegetative detritus. They prey upon injured or trapped fishes using their bladelike molars. Others are parasites attaching themselves on animals such as crabs, barnacles and shrimps. Due to their behavior, most of them are considered nuisance to the environment causing negative impact on vegetation but at the same time contribute to the return of valuable nutrients to the soil.

This isopod maybe mistaken for an amphipod because of its segmented and dorsoventrally-flattened body. The head is small with well-developed antennae, one pair of which is much longer than the other. The largest part of the body, the thorax, is covered with overlapping dorsal plates with seven segments and covered with projections on each side. Each ventral plates of the thorax bear numerous legs or jointed appendages like crabs. Next to the hindmost part of the thorax is the short abdomen with five segments, each of which has flattened appendages on the undersides. The last plate, the terminal anal plate bears many hooks with two short flattened legs on each side. The body of this isopod is elongated almost twice its width. The sightings of these species at the Inner shelf of Davao Gulf are yet to be recorded.

Further studies are needed to fully document this rather, unpopular species. Who knows there is more to this isopod than being the scavenger of the sea.

(Photo courtesy of R. Estrellada)

Introducing...

PAW, the friendly sea turtle

By Rechie U. Jocson

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By Virgie B. Garcia

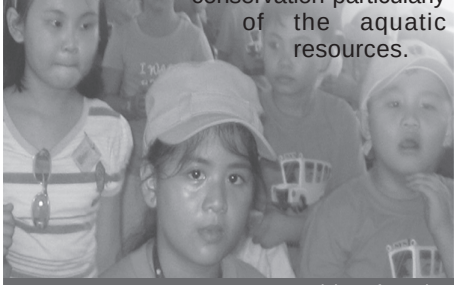
A bulk of almost 2000 guests visited the UPV-MNS from January 2007 until June 2009. Some are researchers, looking for reference specimen if not asking for some aide in species identification. Others are foreign and/or local tourists, exploring interesting places of Panay Island. But most of them are students, pre-school and elementary pupils who are all eager to see "Nemo" and high school and college students who are more interested to know that *Pandaka pygmaea* is no longer the smallest fish in the world!

Museum goers may come as walk-in visitors like the foreigners while some are on their educational trip where MNS is one of the destinations. Visitors on educational tour, usually with appointment, are mostly in bulk with as mush as 200 visitors in a day. Arranged visits, will include film shows and a guided tour.

Based from our previous and present data, it seems that there is no consistent peak and lean months for visitors. There are times when compositions of visitors are mostly researchers/scientists or educators. But this, however, can be used as an indication to mention that museum education can create an atmosphere that encourages professional development. The data from the visitors profile can also be used to determine the best education services to meet their needs and interest.

Within the UPV community, it is also noteworthy to mention that for the past few semesters, Aquatic Science I students are regular patrons of the museum.

As one comment from the guest book would say, "This place offers an educational spot for natural aquatic resources!", the UPV-MNS continues to live up with its objective of being the information arm of the College of Fisheries and Ocean Sciences, when it comes to ecological & environmental awareness, consciousness, education & conservation particularly of the aquatic resources.



Museum visitors from the Dr. Sun Yat Sen High School, Iloilo