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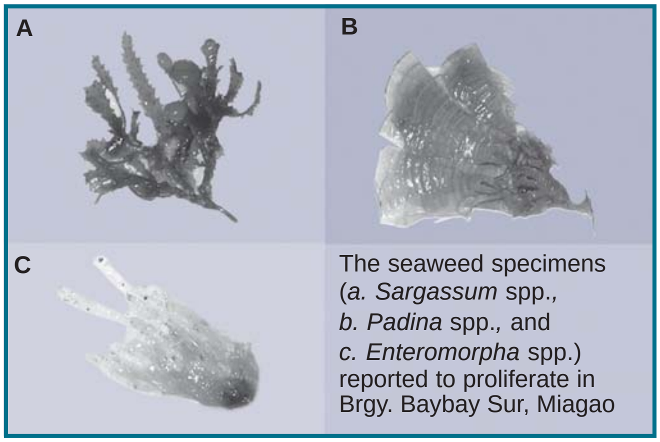
Municipality of Miagao Seeks MNS Services for ID

by S.S. Garibay

Seaweeds of various species found en masse alarmed the coastal residents of Baybay Sur, Miagao on May 13, 2008. This occurrence was reported to the Municipal Office of Miagao, and technical assistance was sought from the University of the Philippines Visayas Museum of Natural Sciences (MNS) in the identification of the seaweeds.

Based on the enumeration of MNS, the specimens collected by Mrs. Lucia Nualla and Mrs. Lourdes Monegro of the Miagao Municipal Health Office, were mostly composed of seaweeds identified as *Enteromorpha* spp., *Padina* spp., and *Sargassum* spp. These seaweeds were not known to have negative effects unlike the algae which bloomed in Barangay Kirayan, Norte, Miagao in March 2005 which brought skin irritations and respiratory problems to coastal residents. Moreover, the occurrence of these seaweeds in big numbers may not be considered unusual since these species proliferate during summer months.



The seaweed specimens (*a. Sargassum* spp., *b. Padina* spp., and *c. Enteromorpha* spp.) reported to proliferate in Brgy. Baybay Sur, Miagao

Meanwhile, the Municipality of Miagao through the Office of the Vice-Mayor had formally requested the UPV Chancellor for the involvement of Mrs. Soledad S. Garibay of the Institute of Aquaculture and Museum Coordinator of MNS and Dr. Jose Peralta, of the Institute of Fish Processing Technology as consultants of the Task Force Harmful Algal Bloom (HAB) of the Municipality.

The immediate report of the community on the observed occurence is highly commendable since it shows their concern to the environment.

The identified specimens were recorded and now becomes part of the Museum collection.

Another Species of Sunfish Now at the Museum

by S.S. Santander

On May 8, 2008, the residents of Barangay Mambatad, Miagao, Iloilo called the attention of UPV Museum of Natural Sciences to identify the huge fish which was accidentally caught by Rizalde Noblezada and Mark Montariel in the municipal waters of Miagao.


The rare looking Sharptail mola, *Masturus lanceolatus* accidentally caught in Brgy. Mambatad, Miagao, Iloilo in May 2008

The entangled organism is a bizarre-looking fish which has a body that comes to an end just behind the dorsal and anal fins, giving it a “half-a-fish” appearance. These are attributes typical of an ocean sunfish, although after examination, it was noticed that the clavus (tail) of the fish is slightly pointed instead of rounded like that of the *Mola mola*. This is a characteristic of another sunfish in the family of Molidae, the *Masturus lanceolatus* or the Sharptail mola.

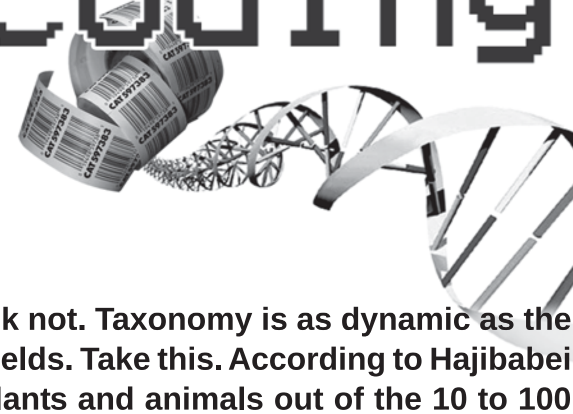
The family Molidae consists of three genera, namely: *Masturus, Mola* and *Ranzania*. Molas are distributed worldwide, in tropical to temperate seas. Two species grow to a maximum of about three meters in length, and 1,500 kg in weight. Fecundity can register an estimated 300 million eggs in *Mola mola*. The young molas are spiny and differ markedly from adults. They are slow-swimming and epipelagic plankton feeders. Some prey on jellyfishes but also feed on algae, crustaceans and fishes.

The fish caught measured 1.95 m from the tip of the dorsal fin to the tip of anal fin and 1.76 m from the tip of the snout to the end of the clavus. It approximately weighs 180 kg.

Pictures and information of the caught mola were submitted to Fishbase for further verification. The preserved specimen will be placed on display at the UPV Museum.

DNA Barcoding

A tool for species identification?



by Carlo C. Lazado
National Institute of Molecular Biology and Biotechnology, UPV

Some say that the science of taxonomy is passe. I think not. Taxonomy is as dynamic as the science of engineering, biology, physics and many other fields. Take this. According to Hajibabei (2006), the known biodiversity is 1.7 million species of plants and animals out of the 10 to 100 million species of the estimated biodiversity. Can you say that it's passe when there is still a lot to do?

We have seen how the science of taxonomy evolved from gross morphology-based to molecular-based identification with the advent of molecular systematics. Lately, molecular techniques have become the new ally of taxonomists' for species identification.

One of the undertakings that spirited both enthusiastic support and raucous antagonism from systematists is DNA barcoding. Most of us are familir with bar codes. These are the black stripes with numbers below, which are known as the Universal Product Code or UPC label that appear on commercial products. Upon payment, the cashier scans it to register the price and some other information may appear like country of origin, manufacturer and the product name. Now, imagine that the fish you buy from *talipapa* bears its DNA barcode and when scanned, gives its true identity, origin and even nutritional facts. Isn't it exciting? But how can this stirring concept be applied to living organisms?

What is DNA Barcoding?

DNA barcoding is a taxonomic method that uses a short genetic marker in an organism's mitochondrial DNA to identify it as belonging to a particular species (www.wikipedia.com). DNA barcoding is another tool in the taxonomists and researchers' toolbox. It is governed by the idea that DNA sequence diversity, whether assessed directly or indirectly through protein analysis can be used to dicriminate species (Ward et al., 2005).

The intent of DNA barcoding is to use the largescale screening of one or a few reference genes in order to: (1) assign unknown individuals to species, and (2) enhance discovery of new species (Moritz and Cicero, 2004).

The Promise

The US National Oceanic and Atmospheric Administration envisions several potential uses of DNA barcode. These are for: (1) more reliable identification of catch and by-catch on commercial vessels and at the dock, (2) better understanding of the food chain through analysis of gut content, and (3) improved fish stock assessments based on identification of larvae as well as juveniles and adults (Science Daily, 17 Sept 2007).

Moreover, not only can specimens be identified as part of a known species using only a tiny piece of tissue from the organism, but new variations in what was thought to be a single species can also be determined. Tissue from unidentified specimens can also be matched to the DNA sequence of a known species in the reference library. This is a process that currently takes a few hours.

The concept of DNA barcoding had been used in identifying birds (Hebert, 2004), Australia's fish species (Ward et al., 2005) and other marine organisms (Ivanova et al., 2007; and Schander and Willlasen, 2005). It was also used in delimiting cryptic species and cataloguing ancient life forms (www.wikipedia.com) . Further, the concept was even utilized in mosquitoes, fungi and mushroom taxonomy (Science Daily, 17 Sep 2007).

The Drawback

Eventhough this field of taxonomic study has gathered enthusiastic acceptance from certain groups of taxonomists, there are groups that criticize the philosophy of barcoding on various grounds and obvious problems that have been pointed out. Some taxonomists rhetorically say that the promise of DNA barcoding would eventually make morphology-based taxonomy obsolete (Moritz and Cicero, 2005; Schander and Willassen, 2005; and Will et al., 2005). Statements of some barcoding proponents suggest an inevitable replacement of taxonomic research rather than augmentation of technology to taxonomic science (Will et al., 2005) as evidenced by Herbert's statement in 2003, "a COI-based identification system will undoubtedly provide taxonomic resolution that exceeds that which can be achieved through morphological studies." Moreover, the generation of *cox1* profiles will provide a partial solution to the thinning ranks of morphological taxonomists by enabling the crystallization of their knowledge before they leave the field.

Another area of dispute is that differences in a single-character system will identify species across all or nearly all life. If this is the point of DNA barcoding proponents, oppositions declare that it will just repeat the faulty ancient typological thinking. Thus, oppositions' debate is not DNA versus morphology, but rather on the single character system (Will et al., 2005).

The cytochrome c oxidase 1 sequence, which has been found to be widely applicable in animal barcoding, is not appropriate for most species of plants because of much lower rate of cytochrome oxidase 1 gene evolution in higher plants than in animals (Kress et al., 2005).

In general, the scientific hullabaloo in this DNA barcoding system is not the method itself but rather the profligate claim that it will transform, substitute and/ or replace the big science of traditional taxonomy.

DNA Barcoding... see page 4

SEA CUCUMBER, the Ginseng of the Sea

by Melchor F. Cichon, CFOS Library

Cited as the center of the center of biodiversity (Carpenter, 2005), the Philippines is so blessed for its natural wealth, especially marine resources. Among these resources is the sea cucumber or the holothuria.

What is a sea cucumber? Definitely it is not a plant. It is a sea-bottom dwelling marine invertebrate that has been a favorite dish among the Chinese and the Japanese because of its nutritional and medicinal value. These are found in shallow waters within the wide seagrass soft bottom beds as well as in coral reef areas. The body of a sea cucumber is elongated, which allows the animal to lie on its side. It does not have arms, mouth and anus at opposite sides. It is black, brown or green in color and may vary in size considerably.

The sea cucumber belongs to the Phylum Echinodermata, Sub-phylum Asterozoa which includes sea cucumber, sea urchin, sand dollar, sea star, brittle star and basket star and under Class Holothuroidea. According to Labe et al (2007), "There are about 100 known species of sea cucumber in the Philippines, 25 of which are harvested commercially".

The Philippines is the second largest exporter of processed sea cucumber meat known as "trepang." In 1984, Palawan is the leading province in sea cucumber production with a total harvest of 436, 630 kg . It is followed by Lanao del Norte (41,426 kg), Albay (19,381 kg), Tawi-tawi (14,085 kg) and Zamboanga del Sur (10,750 kg.) The other provinces that produce sea cucumber are Aklan ,Camarines Norte, Marinduque and Zamboanga del Norte.

Studies have shown that sea cucumbers have medicinal value. According to Dr. Subhuti Dharmananda, Director, Institute for Traditional Medicine, Portland, Oregon:, sea cucumber "serves as a rich source of mucopolysaccharides, mainly chondroitin sulfate, which is well-known for its ability to reduce arthritis pain, especially that of osteoarthritis. As little as three grams per day of the dried sea cucumber has been helpful since it is significantly reducing arthralgia, or joint pains. Chondroitin's action is similar to that of glucosamine sulfate, the main building block of chondroitin." He further claims that the saponins in sea cucumber have anti-inflammatory and anticancer properties.

"In addition," he said, "the sea cucumber oil contains two anti-inflammatory fractions. One fraction has fatty acids characteristic of those found in fish; they can be used as a substitute for fish oil in reducing inflammatory by products of fat metabolism, and to nourish the brain and heart. The main compounds of interest in fish oil are EPA (Eicosapentaenoic acid also found in sea cucumber, and DHA (Docosahexaenoic acid), unique to fish:"

Because of nutritional and medicinal reasons, the demand for sea cucumber has increased. But can the Philippines supply this demand? Based on available statistics, the Philippines do not produce so much sea cucumber, although there is a great potential that the country can produce more. An example of such area is Maqueda Bay, Samar, where one of the most sought after species of sea cucumber, *Holothuria scabra* can be found. Due to its dollar earning potential, the sea cucumber fishery must be given attention. At the same time, the law enforcers should regulate the harvesting of this animal to further prevent its overexploitation.

As a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Philippines has implemented the Fishery Investigation and Molecular Application for the Sustainable Use and Development of Commercial Aspidochirotid Holothurians (Sea cucumber).

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Errata for " The Mouseion" Vol.4. No.1 (Jul-Dec 2007), page 2:
The byline for the article titled "Rarity Of The Rare: The Vanishing Species Of Endemic Freshwater Fishes In The Philippines", "by Marianne Hubilla-Travis, Provincial Environment and Natural Resources Officer" should have read "Marianne Hubilla-Travis, Provincial Environment and Natural Resources Office".

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Crown-of-thorns starfish

(*Acanthaster planci*) plagues Malalison Island

by Alma C. Lisay, Local Government Unit of Culasi, Antique

Coral reef is one of the most vital ecosystems in the marine environment. This important habitat of the numerous aquatic species is threatened by strong typhoons, bleaching, and predation by crown-of-thorns (COT) starfish, *Acanthaster planci*.

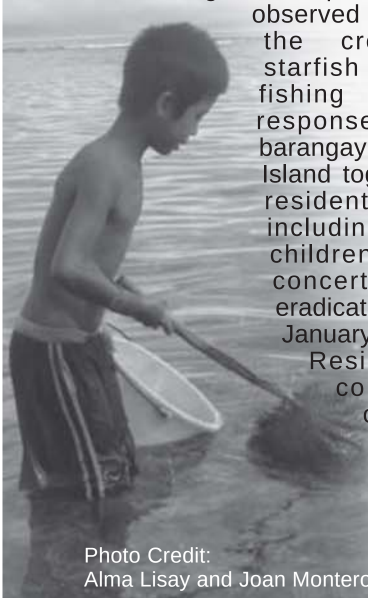

Photo Credit:
Alma Lisay and Joan Monteros

Malalison Island of Culasi, Antique is famous for its clear pebbled white sand, coral reefs and emerald green water rich with various species of fish. But during the last quarter of 2007, the observed proliferation of the crown-of-thorns starfish alarmed the fishing village. In response to this, the barangay officials of the Island together with the resident fisherfolk including women and children led the concerted effort in eradicating the COT on January 22 to 27, 2008. Residents were contracted to collect COT starfish. People were paid twenty five centavos (P0.25) for every COT and about ten thousand pieces were removed from the water and buried in the foreshore area. This phenomenon was also observed in Maniguin, an adjacent island in Culasi, wherein at least twenty thousand pieces of the organisms were found surrounding the shallower waters of the island. Siting of COT proliferation was also reported in Nogas Island, Anini-y, Antique early summer of 2008. Outside Panay, COT outbreaks were previously noted in Mabini, Batangas, Apo Reef and Puerto Galera in Mindoro, Roxas in Palawan, Bolinao in Lingayen Gulf, Kiamba and Glan in Sarangani Bay.

The COT is an echinoderm that belongs to Class Asteroidea, which includes all starfishes. It has 12-19 arms and can grow to one half meter in diameter. It has long poisonous spines covering the upper surface, a feature that has given rise to the popular name of "crown-of-thorns". *Acanthaster planci* is a known predator of coral reefs. A single COT can destroy six square meters of coral reef in a year. An outbreak of this organism is therefore devastating to reef ecosystems. Moreover, COT blooms also render a place unfit for tourism activities. In effect, the local community is deprived of economic opportunities.

What causes the bloom of COT? Outbreaks of this starfish are attributed to illegal collection and overfishing of the Giant Triton (*Charonia tritonis*) and several Wrasse species (including the Napoleon Wrasse or *Mameng*). These marine organisms are known predators of the *Acanthaster* and the over harvest of these organisms leads to COT bloom; which further cause an imbalance in the natural ecosystem. The collection of Giant triton is protected under RA 8550 and therefore should be stictly enforced to prevent COT blooms.

The local government is continually monitoring the presence of COT in their municipal waters. Any sighting of COT is reported for preventive measures to be done to immediately arrest further proliferation.

DNA Barcoding... from page 2

The Future

The single research paper published in 2003 emerged as a global enterprise in 2007 and still growing until this stage. The Consortium for the Barcode of Life (CBOL) has 160 member organizations from 50 countries. The Barcode of Life Data Systems (BOLD) at the University of Guelph, Canada holds 33, 000 records covering 12,700 species in 2005. Records banked 290,000 species in 2007 and up to now, data is accumulated at an accelerating pace. Another North American "barcode factory" is the Smithsonian Institution in Washington D.C. Presently, a network of 17 laboratories are situtaed around the globe to share and disseminate barcoding information and offer training.

Another international movement of researchers who are dedicated to developing DNA barcoding as a global standard for species identification is the Barcode of Life Initiative (BoLI). At present, they are creating tools for a cost-effective and rapid system of species identification that can be used by non-specialists.

It is an inexorable reality that once a new concept emerges, there will be contentions and apprehensions for its acceptance. Also, in every new concept there are promises and perils. What is important is that, we have to look at the general perspective of the concept, to find out whether it help the present situation or it will just make the things worst?

For me, DNA barcoding, whether its a new or old concept, the promise and pitfalls are there with its concomittant advantages and disdavantages. I therefore believe that nstead of focusing or finding the flaws of this concept, taxonomists and systematists should focus in gathering enough information to verify the concept. Truly, we cannot say that molecular taxonomy is the substitute for the old-aged traditional taxonomy. The two areas are exclusive of each other. The use of model ideas from each thought will make species identification objective, systematic and more accurate.

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