INSTITUTE OF MARINE AFFAIRS

IMA NEWS

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Steps in bringing our shrimp to you!

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Marine Shrimp Culture: From Our Tank to Your Plate

Within recent years, much attention has been focused on food security due to an ever-increasing global population. In the context of declining wild marine stocks and relatively destructive shrimp capture methods such as trawling, developing an alternative food supply is crucial. This is important not only for food security, but also to alleviate pressures on stressed global marine stock and their habitats.

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Marine Shrimp Culture: From Our Tank to Your Plate (con't.)

In a 2012 report by the Food and Agriculture Organization (FAO), Pacific white shrimp production was listed as the most successful internationally introduced marine crustacean species for mariculture, accounting for approximately 72% of all farmed marine shrimp species. Asia produces 78% of world production, and the rest is produced in its native home, America. Over the last decade, global production of farmed Pacific white shrimp increased from around 1 million tonnes in 2003 to approximately 3 million tonnes in 2012. According to the FAO, marine shrimp is the largest single commodity in value terms, accounting for 15% of the total value of internationally traded fishery products.

Within this global sphere, the Institute of Marine Affairs (IMA) envisioned a greater thrust into mariculture, with several species and production systems identified for exploration. In 2014, the IMA embarked upon innovative research into culturing the Pacific white shrimp *(Penaeus vannamei)* in tanks, using a production system that recycles seawater more specifically referred to as a marine recirculating aquaculture system (RAS). The primary aim of this research is to raise awareness amongst local fish farmers and potential investors, on the biological, ecological and economic issues affecting marine shrimp in this type of production system. During the first trial held from June 2014 to December 2014, the Pacific white shrimp were grown to a jumbo size, which provided approximately 10-15 shrimp to the pound. The combined weight for the shrimp obtained from the first two tanks at harvest was approximately 300lbs (136kg). The survival rate for shrimp grown in this first trial was 60%. At the shrimp harvest event held at the IMA on 15th December, 2014 Senator Ganga Singh, Minister of the Environment and Water Resources commended the IMA on this initiative.

In order to accomplish the study's objectives, ten-day old postlarvae (PL10) of *P. vannamei* were imported from the United States. Postlarval shrimp (PLs) imported from this supplier were not expected to introduce any known marine shrimp disease to the Institute's system. The first shipment of PLs was received in May 2014. For biosecurity purposes, this shipment was kept quarantined for about one month. A salinity of 30 parts per thousand and a stocking density shown in literature to support positive growth and minimal incidents of carnivorous behaviour, were used for production. Two onsite 20ft (diameter) production tanks were stocked with equal numbers of shrimp.

During their 6-month grow-out period within the RAS, a formulated feed was used at scheduled feeding times. Daily water quality sampling was conducted during the production period for various parameters including but not limited to salinity, pH, dissolved oxygen, and ammonia. Sampling of shrimp, including total length and weight measurements, was undertaken bi-weekly using standard scientific procedure. As water quality parameters were maintained at optimal levels throughout the 6-month period, adequate growth rates, survival and food conversion rates were not only expected, but also observed.

Though the most popular form of marine shrimp production worldwide is pond culture, Trinidad and Tobago in most circumstances has limited combination of resources to culture shrimp using standard earthen ponds. Additionally, high multi-user land conflicts and environmental degradation risks (particularly in coastal regions) result in a general lack of resources to facilitate large expanses of earthen ponds. As such, a RAS is being considered at the Institute to be a viable option for local marine shrimp culture. Not only does such a system have a reduced space requirement, it also minimises the issue of multi-user coastal conflict, as it is less site specific than tidally-influenced coastal ponds, as well as reduces the risk of environmental pollution.

Details of this study and associated future work involving salinity variance and its effect on marine shrimp growth rates, survival, and feed conversion ratios as well as ecological and economic analyses are ongoing, and the results will be presented at the Institute's 2015 Symposium.

For further information on the Institute's work, please visit the website:
http://www.ima.gov.tt/home *or contact us at* **director@ima.gov.tt** *or at* **634-4291/4**

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Wetlands for our Future

Seagrass sampling at Buccoo Bay. *photo: Jonathan Gomez*

Internationally, World Wetlands Day is celebrated on 2nd February annually and this year's theme is '**Wetlands for our Future'**. Each human requires approximately 20 – 50 litres of water a day to meet our basic needs such as drinking, cooking and cleaning among others. Wetlands provide fresh water for all of us and replenish groundwater aquifers. Wetlands purify and filter harmful waste water. Pollutants from pesticides and heavy metals and toxins are absorbed into sediments that are filtered out by the wetlands.

A wetland is an area that is regularly saturated by water (fresh, saline or brackish), and is characterized by a natural ecosystem of plants and animals that are adapted to such conditions. There are three types of wetlands; (i) Inland wetlands which consist of marshes, rivers, swamp wood and palm forest, freshwater marsh and ponds; (ii) Coastal and near shore marine wetlands – mangrove forest, sea grass beds, coral reefs, coastal lagoons, intertidal mudflats, sand flats and salt marshes; (iii) Human made wetlands – rice paddies, dams, reservoirs and aquaculture ponds.

Wetlands also guarantee our food supply. They provide a nursery area for juvenile species and many commercial fish depend on coastal wetlands for part of their life cycle. Rice, grown in wetland paddies, is the staple diet of approximately 3 billion people worldwide.

Wetlands provide storm protection and are considered nature's shock absorbers. Mangroves, saltmarshes and coral reefs all reduce the speed and height of storm surges. The roots of mangroves bind the shoreline, resist erosion by wind and waves and increase resilience against climate change. Coastal wetlands can store large quantities of carbon – (i) their plants capture or sequester large amounts of carbon dioxide and (ii) their soils are largely without oxygen, therefore carbon within the soils decompose slowly, and may remain for hundreds or even thousands of years, storing carbon. Wetlands remove and release carbon and have a positive effect on global climate change patterns.

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IMA EVENTS, ACTIVITIES and OUTREACH

IMA partners with 211 Call Centre, Tobago

In 2008 Tobago Information Technology Limited (TITL) launched the 211 Contact Centre, its "flagship" operation. This centre currently provides members of the public with easy 24-hour access to real time information on Tobago, and Trinidad by extension, by calling a toll free telephone number, 211.

In preparation for TITL's partnering with IMA to promote Lionfish Awareness, Lori Lee Lum, Community Education Officer conducted a training session with four (4) TITL staff members. The public is invited to call in Lionfish captures and sightings around Tobago.

Ms. Racquel Corbie-Colon, Operations Manager, (right) at the Tobago Technology centre receives the "Partnership" certificate

Lecture on Marine Algae

A presentation entitled "Red, Green, Brown Algae of Trinidad and Tobago and the Sargassum Event' was given to 32 Field Naturalists Club members at St. Mary's College, Port of Spain by Lori Lee Lum, Community Education Officer on Thursday 12th February.

This presentation is now available on YouTube!
https://www.youtube.com/watch?v=CAah784xUV4

Lori Lee Lum addressing the Field Naturalists Club

Managing our Coast

Dr. Inniss speaks about Integrated Coastal Zone Management and Climate Change

On Wednesday 21st January 2015, Dr. Lorna Inniss, Director (Ag.) Coastal Zone Management Unit, Barbados delivered a presentation to IMA staff and guests entitled "Integrated Coastal Zone Management and Climate Change: Transitions of the Last Decade".

The dynamic processes that occur within the coastal zones produce diverse and productive ecosystems which have been of great importance historically for human populations. Coastal margins equate to only 8% of the world's surface area but provide 25% of global productivity. Stress on this environment comes from approximately 70% of the world's population being within a day's walk of the coast. Two-thirds of the world's cities occur on the coast. Valuable resources such as fish and minerals are considered to be common property and are in high demand for coastal dwellers for subsistence use, recreation and economic development. Through the perception of common property, these resources have been subjected to intensive and specific exploitation. Our changing climate is also having effects on our coastal resources thus Climate change adaptation is imperative for twenty first century society. It will demand the effective pooling of scientific knowledge and socioeconomic learning processes on a scale and at a pace not previously encountered.

IMA EVENTS, ACTIVITIES and OUTREACH

IMA at District Career Fairs

IMA participated at the Ministry of Education's National District Career Fair at Arima North Secondary School on Tuesday 3rd February and St. Augustine Secondary School on Thursday 5th and Friday 6th February 2015. Approximately 557 students learned about 'Careers in Marine Science'. On Friday 27th February, IMA also participated at the Ministry's District Career Fair at Signal Hill Secondary School, Tobago where 20 students visited the booth.

Students at Career Fair—Signal Hill Secondary School, Tobago

World Wetland Day 2015

The international theme for World Wetlands Day 2015 was **Wetlands for Our Future**. On Monday 2nd February, in recognition of this day, IMA participated in Forestry Division's display at the Caroni Visitor Centre and shared information on the importance of wetlands with primary school students and adults.

Students learn about wetlands from Krystal Chandler-Ganaselal, Information Officer

Sea and Me Programme continues

Std. 3 Pt. Cumana R.C. students

The IMA has worked with Pt. Cumana R.C. School since 2004 under the 'Sea and Me Programme'. A special request was made by the school to assist the Standard 3 and 4 students with a Wetlands Project and to share information on Mangrove Swamps. On Wednesday 25th February, Lori Lee Lum presented on 'Food Chains and Webs' to Standard 3.

IMA'S school outreach heads east

Information Officer Glendon Glasgow addresses Form 3 students of Sangre Grande Secondary

On Tuesday 24th February, presentations on 'Coral Reefs' and 'Marine Pollution' were given to 65 Guaico Government Secondary students and 45 Sangre Grande Secondary students. Coral reefs are some of the most diverse and valuable ecosystems on Earth. They support more species per unit area than any other marine environment, including approximately 4,000 species of fish, 800 species of hard corals and hundreds of other species. Pollution from land-based sources is a primary cause of coral reef degradation throughout the world. In the Caribbean, for example, approximately 80 percent of ocean pollution originates from activities on land.

IMA EVENTS, ACTIVITIES and OUTREACH

2nd Meeting of the Intercessional Working Group for the Development of the IOC Capacity Development Strategy

Dr. Donna-May Sakura-Lemessy attended the Inter-Sessional Working Group for the Development of the IOC Capacity Development Strategy, held at UNESCO Headquarters, Paris, France from 16th -18th February 2015. The Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) was established in 1960 as a body with functional autonomy within UNESCO. The purpose of the Commission is to promote international cooperation and to coordinate programmes in research, services and capacity-building in order to learn more about the nature and resources of the ocean and coastal areas. This in addition to learning how to apply that knowledge for the improvement of management, sustainable development, the protection of the marine environment, and the decision-making processesof its Member States.

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

Lionfish Workshops in Trinidad

On Thursday 26th February 2015 and Monday 23rd March 2015 the IMA hosted Lionfish Workshops and Training sessions in Chaguaramas and Las Cuevas respectively. These workshops presented the background of the Lionfish invasion, its biology, ecological impacts, safe handling techniques, and market development. Another presentation was given to BPTT contractors at the resource centre in Point Galeota.

Coral reef ecologist Jahson Alemu 1 demonstrating how to safely handle the Lionfish

Lionfish sampling at TTHTI's Carnival Event

Patron's line up to taste lionfish at TTHTI's Carnival Event

On Friday 13th February, patrons sampled lionfish prepared by TTHTI's chef. The fish was lightly seasoned and baked and was served in a salad with pineapple and peach in mild vinaigrette... Yum-O!

Wetlands for our Future (con't.)

Wetlands are critical for biodiversity. Nariva Swamp, the largest wetland and largest freshwater swamp in Trinidad and Tobago has a total of 310 macro-plant species and more than 614 animal species. Wetlands provide a habitat for fish and wildlife, support bird breeding and migration. The Caroni swamp is a major roosting site of one of Trinidad and Tobago's national birds, the Scarlet Ibis.

Since 40 per cent of the world's population lives within 100km of a coastline, the conservation of wetlands is crucial. Sustainably managed wetlands provide timber for building and medicinal plants. They are valuable to our culture and education while providing opportunities for tourism and recreation. Tobago's largest revenue stream is derived from tourism.

The main causes of degradation and loss of wetlands are major changes in land use, especially an increase in agriculture,water diversion through canalization, infrastructure development and air and water pollution.

Red Howler Monkey (Alouatta seniculus)

West Indian Manatee (Trichechus manatus manatus)

Areas of wetlands are decreasing worldwide. 64% of the world's wetlands have disappeared since 1900.

Rapid decline means:

- Access to fresh water is eroding for one to two billion people worldwide
- Coastal areas are more exposed to storm surges
- Biodiversity has also been affected
- WWF Living Planet Index: populations of freshwater species declined by 76% between 1970 and 2010

Wetland livelihoods and our biodiversity are all under threat. Participate in World Wetlands Day by visiting a wetland near to you. Educate yourself and others about the importance of wetlands. Take a boat ride along the Caroni Swamp, a walk through the mangrove or a snorkel among sea grass beds or coral reefs to experience first-hand our wonderful wetlands!

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An Agency of the Ministry of the Environment and Water Resources

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THE BLUE CORNER

"Try to leave the Earth a better place than when you arrived."
- Sidney Sheldon

Portuguese Man o' war/Man-of-war

Anyone unfamiliar with the biology of the venomous Portuguese Man-of-war would likely mistake it for a jellyfish. Not only is it not a jellyfish, it's not even an "it," but a "they." The Portuguese Man-of-war is a siphonophore, an animal made up of a colony of organisms working together. The Man-of-war comprises four separate polyps. It gets its name from the uppermost polyp, a gas-filled bladder, or pneumatophore, which sits above the water and resembles an old warship at full sail. The Man-of-war is also known locally as Galey. For humans, a Man-of-war sting is excruciatingly painful, but rarely deadly. But beware—this organism can sting even when washed up on shore.

References: http://animals.nationalgeographic.com/
Photo credits www.wikipedia.org - Scott Sonnenberg

Portuguese man o' war *(Physalia physalis)*

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