



Lionfish (*Pterois volitans*) in Jamaica
 Photograph: Dr. Dayne Buddo, Discovery Bay Marine Laboratory

INSIDE THIS ISSUE

New Appointments Board Member Profile	2
The Importance of an Oil Fingerprinting Database for Trinidad and Tobago	3
Are You at Risk Going to the Beach?	5
IMA Events and Activities	6
Fiery Fire Worms!	8

With its fan-like fins, spines and rays, the Lionfish looks like a Carnival costume being elegantly carried across the stage. Unlike a Carnival costume, it is not part of any local band, not part of Trinidad and Tobago's marine ecosystems, perhaps not until now.

In 2009 and 2010, the IMA published articles in the daily press about the impending threat of the Lionfish, a colourful fish which is used to enhance seawater aquaria. Some believe that they were introduced in the Atlantic Ocean and Caribbean Sea through accidental release into Biscayne Bay, Florida, USA during Hurricane Andrew in 1992.

Lionfish are a threat because they can significantly reduce the population of ecologically important species such as parrotfish and other herbivorous fishes which help to control the growth of seaweed and macroalgae on coral reefs. They can also affect the local reef fishery since they prey on small fish and crustaceans. And those fan-like fins and spines? They are venomous and can administer a painful sting.

Sightings have been reported in more than a dozen Caribbean and Latin American countries. In February 2012, the IMA received its first report of a sighting in Tobago, which is still to be confirmed.

Since 2010, the IMA and other stakeholder agencies, including the Tobago House of Assembly; the Ministry of Food Production, Land and Marine Affairs; the Environmental Management Authority and the Office of the National Co-ordinator for Invasive Alien Species associated with the Centre for Agricultural Bioscience International, have been collaborating on a public awareness campaign to meet the threat of this invasive alien. Under the Chairmanship of the IMA, the agencies are developing a National Strategy and Response Plan for the Lionfish.

The Strategy would address the recent history of invasion of Lionfish in the Caribbean and impacts on marine ecosystems, in particular, reef systems. It would include medical response, communication, public awareness and education, and training and research components.

NEW APPOINTMENTS

Asha Singh

Dr. Singh is the first appointee to the position of Principal Research Officer of the newly established Marine Governance and Policy Programme which replaces the Legal and Policy Research Programme. Its work includes: development of new approaches to the assessment of the environment, identification of causes of environmental degradation, understanding the processes that drive environmental change, and exploration of the participatory approach from a marine policy and governance standpoint.

Dr. Singh is an inter-disciplinary socio-economic scientist who has over 14 years of professional experience in the area of sustainable development, climate change, Multilateral Environmental Agreements, marine policy and governance and Small Island Developing States (SIDs). Her work experience includes tenures in the Caribbean, UK, and US with collaborations in Pakistan, Latin America, Canada and SIDs in the Caribbean, Pacific, and Africa, Indian Ocean, Mediterranean and South China Sea regions. She has also worked for the Guyana and Trinidad and Tobago Governments, NGOs, the UN and in academia. Dr. Singh held a UN fellowship in 2008 working in the area of Governance and Sustainable Development.



Avril Siung Chang

Dr. Siung Chang joined the staff as Scientific Advisor at the beginning of March 2012. She will be working with the Director to strengthen the research agenda of the IMA.

Dr. Siung Chang is not new to the IMA. She worked here from its inception in 1979 to 1996, first as a Research Officer in the Coastal Zone Management Programme and then as Principal Research Officer of the Environmental Research Programme, which she established. She has a BSc. degree in Zoology from the University of Newcastle-Upon-Tyne, England and a PhD. in Marine Zoology from UWI, Mona, Jamaica. Since 1996, she worked with the Pan American Health Organisation/World Health Organisation as an Environmental Health Advisor.



WELCOME TO THE IMA!

LORRAINE BARROW
JUNIOR DARSAN

- Librarian
- Senior Research Officer
(Coastal Geomorphology)

BASHIRUDDIN HOSEIN
REENA RAMDASS

- Marine Technician
- Internal Auditor

SEEMA RAMKISSOON

- Research Officer
(Microbiology)

RACHAEL SHOY

- Research Officer
(Fisheries)

KYLE WILLIAMS

- Laboratory Technician

BOARD MEMBER PROFILE



Shafiath Khan

Mr. Khan is currently serving as the Deputy Chairman of the Board of Governors at the IMA. His focus is to aggressively pursue regulatory compliance initiatives with respect to the Environmental Management and Occupational Safety and Health Acts of Trinidad and Tobago. He aims to work closely with the Board of Governors and staff to realize the IMA's vision and mission.

Mr. Khan is the Managing Director of Shafiath Safety Solutions. He has years of experience in Health and Safety primarily in the petro-chemical sector in Suriname, Barbados and Jamaica. He has held senior management positions at the Sugar Manufacturing Company and Weldfab Limited, and previously served on the Board of Governors at the Solid Waste Management Company Limited. Mr. Khan holds a BSc. in Industrial Management from UWI and an Advanced Associate Diploma in Environmental Health and Safety from Government Institutes of the United States. He is a certified Tap Root Incident investigator and an authorised Occupational Safety and Health Administration Trainer for the Construction Industry.

THE IMPORTANCE OF AN OIL FINGERPRINTING DATABASE FOR TRINIDAD AND TOBAGO

by Dr. Darryl Banjoo, Principal Research Officer, Marine Chemistry Department

We quite commonly hear of oil spills in the waters of Trinidad and Tobago and no one seems to know the culprit. The fact that we are a significant oil and gas producer with an extensive system of oil pipelines, and refining and transport operations, means that oil spills are not unusual. Oil also leaks into the marine or terrestrial environment from natural seeps.

In some instances, spills are reported and clean-up operations conducted by the responsible party - usually oil companies which have the necessary equipment to do so. In other situations, there are 'mystery spills' where no company claims responsibility and the source is otherwise unknown. In these instances, samples of oil are collected and sent to a laboratory for analysis so that its origin can be traced. This analysis is termed 'oil fingerprinting' and is particularly useful when the results are used as evidence for litigation against the responsible party (or parties) or when there are claims to be made for compensation by affected parties.

TYPES OF OILS

Crude oils differ from country to country and, at times, from different exploratory fields in a single country. Refined oils consist of both fuel oils and lubricating oils. Gasoline, kerosene and diesel are fuel oils that are derived from the refining process and separated according to their different boiling points.

Heavier oils are used for lubricating purposes and are the ones with higher boiling points. Fuel oils range from fuel oil number 1 to 6 according to a grading scheme used for refined oils. You might be familiar with diesel fuel that is used in trucks and consists largely of fuel oil number 2. Fuel oil number 6, also known as bunker 'C' oil is commonly used to power large ships. Because of the high viscosity of fuel oil number 6, it does not flow easily and is usually mixed with fuel oil number 2 to make it less viscous or more 'runny'. All of these oil types can be distinguished by oil fingerprinting.

HOW IS OIL FINGERPRINTED?

Like human 'finger-prints', in which the differences in patterns of our fingers can be used to distinguish one person from another, the differences in the pattern of oil composition can distinguish one oil from another. This is done by first collecting a sample and separating it into various fractions. Each fraction is analysed using instruments to give 'print-outs' of their chemical compositions. The 'print-outs' are in the form of graphs called 'chromatograms', which are then interpreted by chemists.



Dr. Darryl Banjoo collecting a sample from an oil spill in the Grier Channel, in January, 2012



Shane Ramsammy shows an oil sample from a 2012 spill in Chaguaramas

The Importance of an Oil Fingerprinting Database for Trinidad and Tobago cont'd from pg 3

One technique that is used to create the chromatograms is called Gas Chromatography-Mass Spectrometry (GC-MS). GC-MS is the most reliable method to fingerprint an oil sample since it uses a multi-parameter approach in which individual compounds present in a sample are identified.

On contact with the environment, oil undergoes a process called 'weathering' in which its composition changes and it looks different from the original material, thus complicating the job of oil fingerprinting. Timely collection of samples after a spill is therefore critical to successful fingerprinting.

Oil fingerprinting of a sample can determine what type of oil it is, for example distinguishing it from a crude oil source or a refined oil source. Oil fingerprinting can also be used to make a 'link' between a 'suspected' oil source and the spilt samples collected from the environment. In cases where the source is of an unknown origin, it is important that Trinidad and Tobago builds an extensive database of oils that are either produced locally, or crude oils that may be imported or shipped through our waters, to assist in determining the identification of oils when spills occur.

The IMA plays a key role in the National Oil Spill Contingency Plan (NOSCP) of Trinidad and Tobago. The NOSCP outlines the response measures that must be undertaken during an oil spill. The Ministry of Energy and Energy Affairs is the national coordinator and has the lead role in coordinating with other agencies involved in the response plan. As a partner in the NOSCP, the IMA has responsibility for the development of the oil fingerprinting database; the fingerprinting of oil spills; and the determination of the impact of contamination.

In 2004, the IMA conducted an oil spill seminar the goal of which was to increase public understanding of the nature of oil spills, their effects upon the marine and coastal environment, and the role that stakeholders can play in minimizing their negative effects. In 2010, a follow-up workshop was held. Participants who would be first responders in the event of a spill were trained in sample collection for the purpose of oil spill fingerprinting.

The development of the oil fingerprinting database goes hand in hand with the continued exploitation of petroleum resources in Trinidad and Tobago.

Rishi Bickramdass demonstrates the extraction of a sample for fingerprinting during the 2010 IMA Oil Spill Sampling Workshop



ARE YOU AT RISK GOING TO THE BEACH?

Beaches can be risky places to visit. Overexposure from the sun, jellyfish and stingrays in the shallows, and the hazard of rip currents near shore can all put a damper on a fun day at the beach. These dangers can be observed and avoided by the alert beach-goer. The unseen dangers are trickier to elude.

Several years ago, a notice was placed at a popular beach in Chaguaramas warning beach-goers of the likelihood of poor bathing water quality following periods of heavy rainfall. However, the carefree beach-goers seemed willing to risk their health as they ignored the warning, and bathing activities continued unabated. What were the potential health risks to which they were being exposed?

There is the risk of infection associated with swimming in sewage-contaminated water. Animal and human wastes contain pathogens (disease-causing organisms) which may survive in sea water, thereby posing a risk to human health. Gastroenteritis is the illness most commonly associated with swimming in sewage-contaminated water. The presence of viruses in sea water is believed to be the major cause of other swimming-associated illnesses such as hepatitis; respiratory illnesses; and ear, nose and throat ailments. Bacterial pathogens can cause vomiting, diarrhoea, stomach aches, nausea, headache, and fever. Other complaints such as skin rashes and conjunctivitis or 'red eye' may also be contracted due to the presence of protozoan parasites in sewage-contaminated water.

The IMA has been conducting bacteriological water quality studies at some beaches since 1981. Initial evidence revealed that certain beaches were indeed sewage-contaminated. A subsequent epidemiological study was conducted to investigate swimming-related illnesses at four popular beaches in Trinidad namely Maracas Beach, Chagville Beach, Welcome Bay and Macqueripe Bay. The results indicated that a significantly higher number of swimmers than non-swimmers reported symptoms of skin infection, ear infection, eye infection and gastrointestinal illness. The highest reported illness incidence rates were for respiratory illness, while the lowest illness rates were for ear infections.

HOW CAN I PROTECT MYSELF AT THE BEACH?

- *It is not advisable to swim immediately after heavy rainfall when surface run-off, storm water and increased river flow into near shore waters of some beaches may result in a decline in bathing water quality.*
- *Generally, you should avoid bathing where any form of wastewater flows from land into near shore waters.*

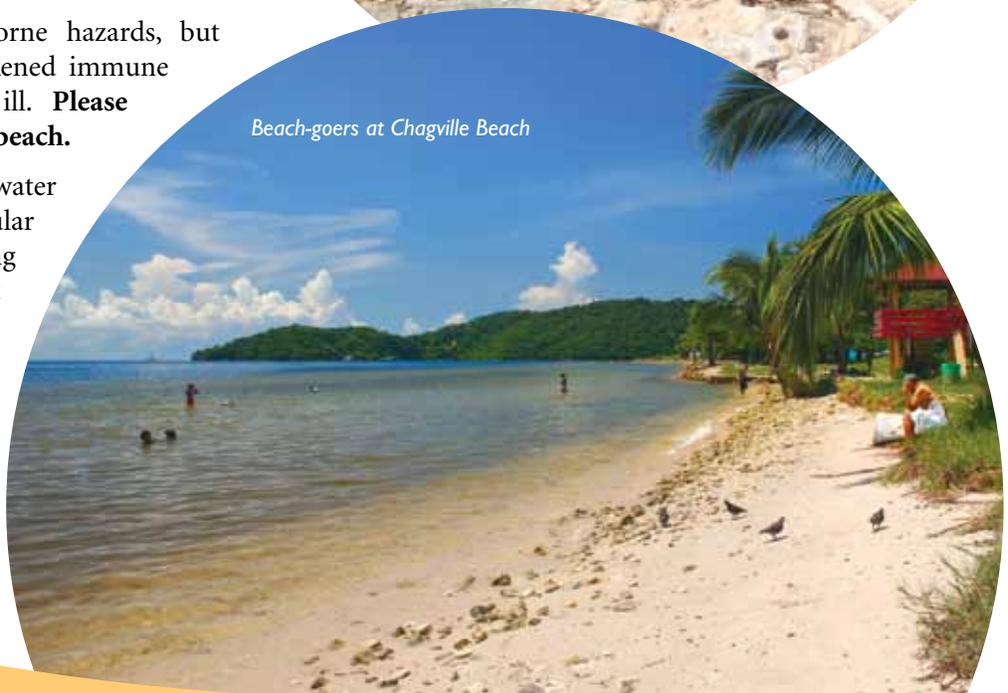
All bathers may be exposed to waterborne hazards, but children, the elderly and those with weakened immune systems are more susceptible to becoming ill. **Please keep these tips in mind as you head to the beach.**

The IMA is working towards instituting a water quality monitoring programme at popular beaches in Trinidad and Tobago, providing beach-goers with ready access to current bathing water quality data for their favourite beaches.

This article previously appeared in a daily newspaper.



Visitors enjoying Macqueripe Bay



Beach-goers at Chagville Beach

IMA EVENTS & ACTIVITIES

Our Thirsty Planet

Dr. Rahanna Juman, Senior Research Officer, Environmental Research Programme, attended the Pacific Lutheran University's 2012 International Symposium, *Our Thirsty Planet* from February 22nd-24th 2012 in Tacoma, Washington. Dr. Juman gave a presentation on the state of the coastal and marine environment in Trinidad and Tobago, its vulnerability to impacts from climate change, and the need to develop an Integrated Coastal Zone Management Plan as a means of adaptation. The Symposium was attended by a number of international scientists.



Dr. Rahanna Juman

Western Mid-Atlantic Regional Workshop

Dr. Amoy Lum Kong, Director, attended the *United Nations Environment Programme/Convention on Biological Diversity (CBD) Wider Caribbean and Western Mid-Atlantic Regional Workshop to facilitate the Description of Ecologically or Biologically Significant Marine Areas (EBSAs)*.

The workshop was held in Recife, Brazil, during 28th February to 2nd March 2012. In preparation for the Workshop, Mr. Jahson Alemu I and Dr. Lum Kong developed a proposal for the Buccoo Reef Marine Park to be declared an EBSA, using the EBSA criteria. At the Meeting, Eastern Caribbean delegates worked on integrating their individual submissions (including the Buccoo Reef submission) into the larger Eastern Caribbean EBSA proposal for consideration by the CBD Secretariat.



(From left to right) Dr. Susan Singh-Renton, Deputy Executive Director, CRFM, Dr. Amoy Lum Kong, IMA Director and Dr. Judith Gobin, Lecturer, UWI, St. Augustine at the reception of the Western Mid-Atlantic Regional Workshop.

Meetings

Dr. Asha Singh, Principal Research Officer, Marine Governance & Policy attended a *Broad-scale Marine Spatial Planning Meeting* at the Sanctuary of Marine Mammals, Samana, Dominican Republic. The meeting was hosted by UNEP-Caribbean Environment Programme (CEP) from 21st-24th March 2012.

Rosemarie Kishore, Senior Research Officer, Fisheries and Aquaculture Research Programme attended the Third International Steering Committee Meeting and Mid-term Review of the UNEP/GEF project, *Mitigating the Threats of Invasive Alien Species in the Insular Caribbean* from 22nd-28th January 2012 in Havana, Cuba.

Training

Candice Leung Chee, Research Officer Environmental Research Programme, attended a training session on *Hydrodynamic modeling using 'flexible mesh'* from 27th-28th February 2012.

The course was designed to assist professionals in hydraulic engineering and management, working with inland flooding, coastal areas or the marine environment. The programme was held at UWI St. Augustine's Department of Geomatics, Engineering and Land Management, Faculty of Engineering.

Tabaquite Community Science Week

The IMA, through the Information Centre (IC), participated in the 12th NIHERST/NGC National Science Centre Community Science Week, from 6th - 10th February 2012 at Tabaquite Secondary School. Ysharda Clement of the Environmental Research Programme assisted the IC team.

The aim of this activity was to promote science education in rural communities and to provide children and adults with a fun science experience. There were 13 Primary Schools and 2 Secondary Schools with approximately 850 students and teachers visiting the IMA's interactive booth during the Science Week.

Students huddle to learn about marine habitats



World Wetlands Day 2012: Wetlands and Tourism

The IMA was an exhibitor at a World Wetlands Day celebration at the Caroni Swamp Visitor's Centre on 30th January 2012. The event was hosted by the Ministry of Housing and the Environment and the Forestry Division.

Information Officers Krystal Chandler and Glendon Glasgow interacting with students at the World Wetlands Day celebration at the Caroni Visitor's Centre.

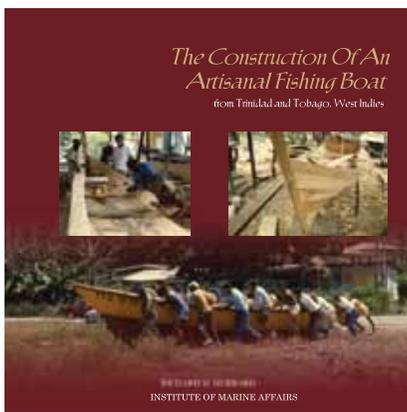
IMA reaches out to schools in Tobago

IMA's School Outreach Programme in Tobago took place from 6th-10th February 2012. Presentations on Marine Pollution, Coastal Erosion and Landforms, Coral Reefs and Marine Mammals were delivered to eleven Primary Schools, three Secondary Schools and one community group in Belle Garden and Scarborough. The team consisted of two IC staff members and Christopher Alexis, Junior Research Officer of the Environmental Research Programme who delivered the presentations to the Secondary Schools.



Information Officer Krystal Chandler (third from left (stooping) with students from John Roberts Memorial School of S.D.A. in Glamorgan, Tobago

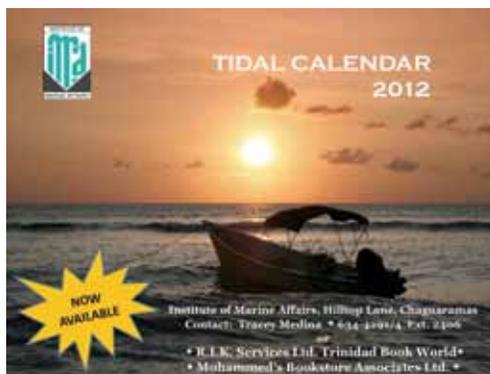
IMA Publications for Sale



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Available at:

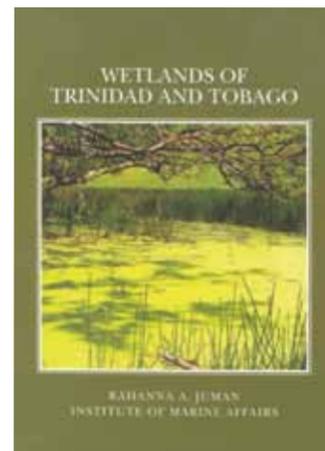
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- Metropolitan Book Suppliers Ltd. Capital Plaza, Port of Spain
- R.I.K Services Ltd. (Trinidad Book World)
- Mohammed's Bookstore & Associates Ltd.

THE BLUE CORNER

After a visit to the beach, it's hard to believe that we live in a material world. ~Pam Shaw

Fiery Fire Worms

A bearded fire worm with flared bristles



- Bearded fire worms, *Hermodice carunculata* are a type of marine bristle worm.
- They usually range between 5-10 centimetres in length, but can reach up to 35 centimetres.
- They are found throughout the tropical western Atlantic and occur on reefs, under stones and in grass beds.

The bristles, when flared, can penetrate human skin, injecting a powerful neurotoxin and producing intense irritation and a painful burning sensation around the area of contact. The sting can also lead to nausea and dizziness. This sensation lasts up to a few hours but a painful tingling may persist around the area of contact. First Aid should include application and removal of adhesive tape to help remove the spines; applying alcohol to the area will also help to alleviate the pain.

Sources:

Greenberg, Idaz (1986). Guide to Corals & Fishes of Florida, the Bahamas and the Caribbean. Seahawk Press. p. 61
<http://www.cieebonaire.org/photo.html>