

Newsletter of the



OCEAN NEWS

ISSUE 1 | 2021

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Ocean Lens

DON'T TAKE MY BREATH AWAY

Mamak Session

Activity Updates

Squat shrimp (*Thor amboniensis*), also known as 'sexy shrimp' from the way they shake their behinds.

---more in OCEAN LENS



MALAYSIAN SOCIETY OF MARINE SCIENCES

(PPM-001-10-01061978)

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MESSAGE FROM THE EDITOR

Dear Oceannews readers and members,

Welcome to the first issue of Oceannews 2021!

As the pioneer marine science focused society in the country, the Malaysian Society of Marine Sciences (MSMS) aims to promote and advance knowledge of all aspects of the marine sciences, with particular reference to Malaysia and our neighbouring region. This newsletter serve as a platform for our members to discuss on marine environmental health through sound science. We believe this brand new full coloured issue will bring the best reading experience to our beloved readers with these stunning photos of our ocean.

This newsletter highlights the research projects and some interesting stories shared by our members. We are also thankful to Febri Sukiato who was willing to share her wonderful experience with some impressive photos. You will also learn some facts about seagrasses through a compelling infographic. In this issue, we are blessed to have 5 talented young marine researchers to feature in our new column "Mamak session" as they share their fun experiences and thoughts.

Last of all, we take this opportunity to thank all authors and volunteers for their contribution to make this newsletter success. Happy reading!

Man Ying

Episodic blooms of the pinkish-brown salp *Pegea confoederata* (Tunicata: Thaliacea) in Malaysian waters

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We report five episodic blooms of the pinkish-brown salp *Pegea confoederata* (Forskål 1775) in Malaysian waters occurring between July 2017 and August 2019. On 28 July 2017, a swarm of *P. confoederata* consisting of solitaries and aggregates was detected at Pulau Kapas, Terengganu (N 05°12'56", E 103°15'44"), close to its western shoreline. The second bloom occurred on 19 August 2017 in relatively high abundance at Pulau Pom Pom, Sipadan, Sabah (N 04°35'51.4" E 118°51'41.1"E). The year 2018 also recorded two blooms, one on 15 February and another on 3 April, both at Pulau Tengah, Mersing, Johor (N 02°28'25", E 103°57'29") in a huge swarm, covering the surface waters. On 14 August 2019, Pulau Pom Pom of Sabah recorded the recurrence of the bloom. For each of these blooms, specimens of *P. confoederata* were hand-collected from tidal zones, examined under a stereomicroscope, and videoed. The specimens

were kept alive for three hours, which were evident from the undulating motion of muscle contractions. The specimens were then preserved in 5% formalin. Altogether, 54 solitaries (average length 90 mm) and 56 aggregates (average length 35 mm) of *P. confoederata* were examined and taxonomically identified based on the identification key of van der Land & van Soest (2001). These identified specimens were deposited in the Repository and Research Center South China Sea Museum Specimens lot numbers: UMTTn0011, UMTTn0012, UMTTn0013, UMTTn0014 and UMTTn0015 for reference collection in Universiti Malaysia Terengganu (UMT) in Kuala Nerus. Findings of this study suggested that blooms of the pinkish-brown salp in Malaysia waters appeared to be more regular between July and August although further field verification is needed. Although massive occurrences of *P. confoederata* were intermittent in

ARTICLES HIGHLIGHT

Malaysian waters, the record of five incidences over two years in this study suggested that the bloom of this jelly-like animal in Malaysian waters would likely increase in the future. Therefore, further studies would be needed to better understand the causes for the abrupt transportation of *P. confoederata* by currents, which would alter the dynamics of the marine ecosystem, because, in a dense population, *P. confoederata* would, via non-selective filter-feeding, deplete the phytoplankton stocks and hence the food source for pelagic fishes.

Acknowledgement

We are grateful to villagers of Pulau Kapas, Terengganu; Siva Prakash, and Tanya Leibrick of Babi Tengah Island Conservation for the information and their kind hospitality. We thanked Jeethvendra Kirishnamoorthie of Tropical Research and Conservation Centre (TRACC) for updating the salp bloom events in Sabah.

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The chain of aggregating salps.



A mature solitary with encircling clones of young aggregates.



A team member doing pneumatic drilling of a core on a massive coral.

LOOKING INTO THE HISTORY

Jennie Lee

Senior Lecturer, Universiti Malaysia Terengganu

In collaboration with Jani Tanzil (National University of Singapore), Soong Keryea (National Sun Yat-Sen University Taiwan), Nathalie Goodkin (American Museum of Natural History), Aazani Mujahid (UNIMAS), and Zarinah Waheed (UMS).

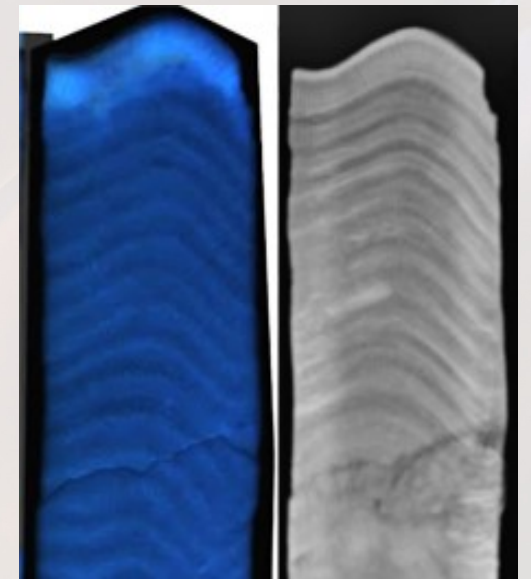
#ThisDayInHistory is common for remembrance of special events in the past. But how much do we know about the past of reefs? Thus, we aimed to find and investigate knowledge of

reefs using corals. For the past 10 years, our team has been collecting archives of coral cores from reefs all over Malaysia and nearby regions. Coral cores can be collected as a whole colony (small coral) or using multiple different drillers (electric, pneumatic and hydraulic). The longest coral core that we have collected was 4.2m and the oldest collected coral was 302 years old (it was only 1.75m). This indicates that coral growth rates are different for various areas.

Coral growth can be measured by linear extension (cm yr⁻¹), density (g yr⁻¹), and calcification (g cm⁻³ yr⁻¹). Their calcium carbonate (CaCO₃) skeleton is very similar to human bones. They also build up layer upon layer per year just like tree rings. Thus, their age can be calculated from the rings and also X-ray scanned like a hu-

man to know its density. As they grow and build up skeleton, they also incorporate other information such as temperature (eg: Sr/Ca), terrestrial input (eg: Ba/Ca), and many others. Corals are indeed a powerful recorder of the sea.

What do we know **#ThisDayInHistory** in 1975 about the coral in Tioman during the establishment of MSMS? Massive Porites calcification was 2.64 g cm⁻³ yr⁻¹ then. But after 30 years in 2005, it dropped to 2.22 g cm⁻³ yr⁻¹ and got worse in 2010 during the El-Niño event with 1.51 g cm⁻³ yr⁻¹ (Tanzil et al. 2013). The corals are struggling to grow and their health (by calcification) is declining with the increase of multiple stressors. Just like us, their health needs to be monitored regularly.



Coral cores slab under UV light and X-ray.

Uniqueness of marine invertebrate and algae herbivory

Kishneth Palaniveloo

Institute of Ocean and Earth Sciences (IOES), Universiti Malaya

The sea hare *Aplysia dactylomela* is an opisthobranch mollusc that is found in both tropics and temperate waters. A graceful invertebrate, it scours the waters in large numbers during dawn or dusk in search for food. They are herbivorous creatures known to selec-



Sea hare chilling in the shallow waters of Mantanani Island.

tively feed on the red seaweed from the genus *Laurencia*. This seaweed is well known scientifically for its diverse array of chemical compounds with varying biological properties such as anti-microbial, anti-cancer, anti-inflammatory and much more.

Some of these compounds are unique to individual species of the red algae. We now know that the sea hare consumes these seaweeds and bioaccumulates the compounds within its tissue as its defence from predators. This characteristic is important for their survival since they are slow moving creatures. Incorporation of these chemi-

cals into their tissue make them distasteful to predators and it can also be secreted into the water body to disorientate them. Since the sea hare accumulates these compounds within them, the concentration of compounds tends to



Red algae Laurencia similis in Sabah.

be high from its constant consumption of the seaweed. From an ecological angle, studying the diet pattern of the sea hare can reveal information on the diversity of red algae growing in an area. This can be very useful to assist collection of ecological data for algae when it is not easily found underwater. Furthermore, the sea hare also has the potential of biosynthesis naturally occurring compounds into new chemicals which possess unique chemical structures with potent biological properties. Many drugs come from the marine environment, specifically invertebrates which are being tested for future drug development. An interesting field of study to venture in!



K.L. Chew

K.L. is a born and bred islander with a deep love for the ocean, spending most of the year diving and conducting research on islands around Malaysia. This wild encounter occurred when K.L. was working for Lang Tengah Turtle Watch, a sea turtle conservation organisation on Lang Tengah Island, Terengganu, Malaysia.

Monsoon was just a few months away. The weather was exceptionally hot and humid as usual at that time of the year. It was a fruitful sea turtle nesting season for the island and the team had many nests to inspect that day. The trees provided little comfort to protect us from the scorching sun but the volunteers and interns hunkered down to get the job done. Buckets of sweat later, the main task of the day was completed.

Dying to cool down from the late afternoon heat, I headed out with volunteers and interns for a snorkelling excursion. We were swimming off the edge of the coral reef, then out of the blue, a juvenile whale shark came out from the depth of the sea. It was my first time seeing a whale shark, and I was deliriously happy seeing one approaching us. However, the glee of seeing this charismatic creature for the first time was soon replaced with a gripping feeling of fear and worry. An ominous long plastic strapping band caught our attention.



As the whale shark swam closer to the surface, my heart dropped at the sight before me. The left pectoral fin had been cut a fourth of the way down by the band. Barnacles of different sizes could be seen throughout the length of the band - a sign that the fin was

WILD ENCOUNTER

slowly being severed over a long period. Fortunately, the cut on the front part of the pectoral fin had healed. The whale shark stayed near the surface and kept circling us. As I looked into its eyes, I felt a desperate call for help coming through its gaze. A unanimous decision was made – we had to remove the strapping band.

My interns snorkelled around to look for a sharp object to cut the band while I looked after the volunteers and the whale shark. After a quick search around the coral reef, a suitable shell was found. One of my interns and I then took turns diving to try to cut the band but failed miserably. Disappointed but not disheartened, we looked for a different approach to remove the strapping band. We dove down a couple times to further inspect the band and discovered that the band was pasted together at a section. With the new glimmer of hope, we quickly removed the barnacles around the area and peeled the band apart at the glued area with the shell. Hands moving slowly and carefully, a muffled scream of joy was let out underwater as the band was pulled out from the fin.



I went down for a final dive to check on the whale shark and was relieved to see that we didn't cause any further damage to the fin. After the nerve-racking rescue, we were accompanied by the whale shark for a short while before it returned to the blue. The swim with the gentle giant was a short but deeply treasured moment of my life. It is an encounter that holds a special place in my heart and affirmed my decision to stay on the path of marine conservation.

AQUACULTURE – A WAY TO DEAL WITH FOOD SECURITY ISSUES

Arooj Fatima Tul Zahra

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Aquaculture is the breeding, raising and harvesting of aquatic living organisms under managed and partially controlled conditions. Aquaculture plays an essential role in tackling food security issues, especially for developing countries. It creates income generation and employment opportunities for the local communities. Also, it allows access to cheaper seafood with excellent nutritional values benefitting the health of the consumers. Aquaculture is one of the fastest-growing food sectors, and global seafood consumption produced from fish farming is expected to increase to 62 % by the year 2030 (Figure 1).



Figure 1: Global Seafood Consumption (Bank 2013).

Advancements in aquaculture technologies are behind the rapid growth of aquafarming, and "Transgenic fish" is playing an important role in it. Transgenic fish are produced through artificial modification of the organism's genomic sequences by introducing another organism's genes (Transgene) containing specific traits (Figure 2). Some results of genetic modifications are improved growth rate, high-temperature tolerance and disease resistance.

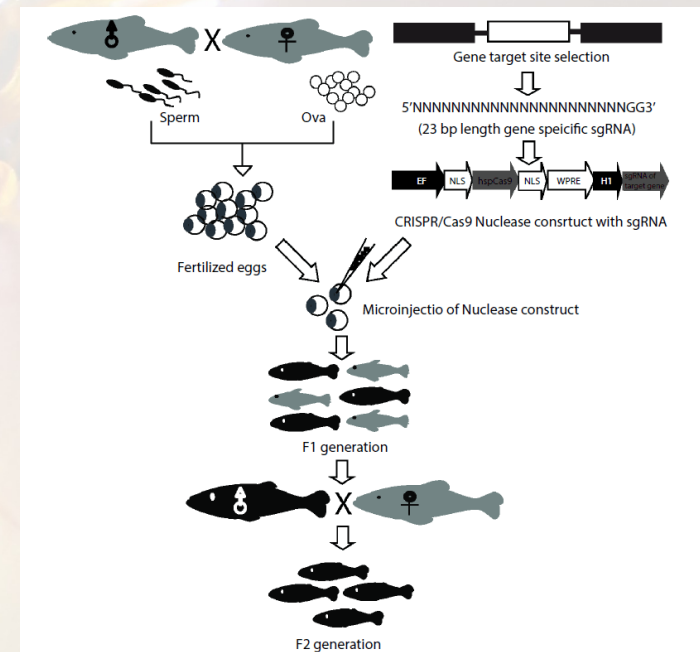


Figure 2: General process of transgenic fish production using gene editing technology (Kumar et al. 2016)

Transgenic fish technology can be used to modify the species of fishes that belong to a specific area or region to improve the economy and growth of the local communities. A proposed study is to modify the genomic sequence of the snow trout to increase its temperature tolerance and growth rate. Snow trout is a ray-finned fish found in the Himalayan region of developing countries, including Pakistan, India, Bhutan, Afghanistan. It is the most consumed fish food of the local communities, but it only spawns twice a year for about two months, each time when the temperature ranges from 8 °C to 22 °C.

Aquafarming of the snow trout could be possible for the local communities if it is genetically modified by the addition of Heat Shock Protein (HSP) genes from devil worm genomic sequence and Antifreeze Proteins (AFPs) from winter flounder genomic sequence (Figure 3). It will enable snow trout to spawn throughout the year by surviving in extreme temperatures.

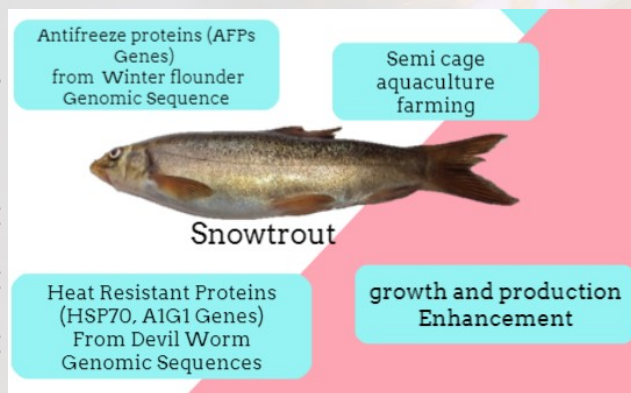


Figure 3: Transgenic Snowtrout - Introduction of HSP and AFP genes

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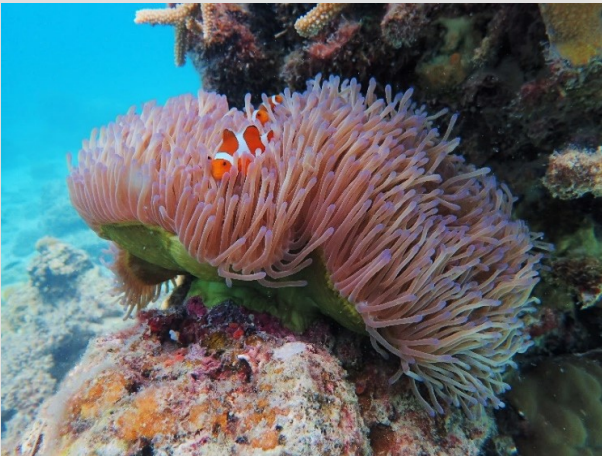
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Vibrant flowers of the sea

Raveena Kumarasamy

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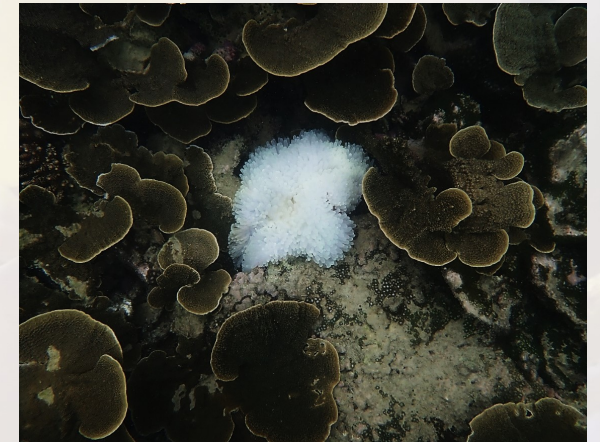
The 2003 Pixar movie "Finding Nemo" struck a chord with audiences for its heart-warming story and (somewhat) accurate depiction of the underwater kingdom. Nemo or the false anemonefish are famous among reef-dwellers, but what about the habitat they live in? Sometimes called the 'flowers of the sea', sea anemones form symbiotic alliance with anemonefishes that live within the anemone's tentacles and obtain protection from predators.



The ornately coloured sea anemone (pronounced "see uh-nae-moh-nee") belong to the Phylum Cnidaria, along with jellyfish and corals. Most sea anemones live attached to rocks or on coral reefs but can also move when needed. *Heteractis mag-*

nifica, also known as the "magnificent anemone", is one of the most dominant species of sea anemones in Malaysian waters. Their bodies are composed of an adhesive pedal disc, a cylindrical body, and tentacles surrounding a central mouth.


Many people may have the wrong impression that sea anemones are a type of "plant" growing in the sea. In fact, anemones are actually animals. Their vibrant colours come from the endosymbiotic microalgae called zooxanthellae that provide photosynthetic nutrients to their host anemone and in exchange, the host provides inorganic nutrients and protection. The greatest present threat to sea anemone health is bleaching which is the expulsion of the algae by the host. Extreme environmental conditions, such as combined high temperatures and intense light, are identified as major causes of bleaching.



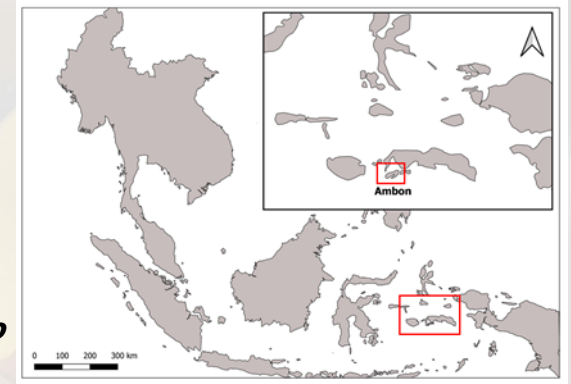
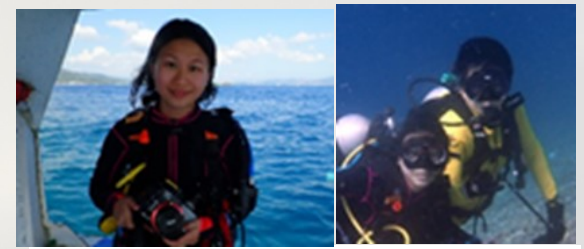
As part of her MPhil research, Ms. Raveena Kumarasamy studies in situ photosynthesis of the zooxanthellae within *Heteractis magnifica* anemone from Pulau Payar and Pulau Rawa, Johor using the underwater chlorophyll fluorometer (Walz-Diving-PAM) that measures chlorophyll a fluorescence from zooxanthellae in a non-invasive way. With increasing threats from global climate change, ocean-acidification, and turbidity, it is critical to understand the physiological plasticity of anemones. Thus, data obtained are important as standard values for photosynthetic capacity of *H. magnifica* and to assess their health in Malaysian waters.

Diving into the muck in Ambon

Muck diving doesn't look too spectacular at first glance. Unlike the vibrant colours of the coral reef, or the awe-inspiring view of a large shipwreck, muck diving involves getting down into a muddy, dark substrate, often with poor visibility, and not much else to the untrained eye. But if you look closer, there is a dazzling array of tiny biological oddities often hiding in the mud. In January 2019, my mother and I went to Ambon, the heart of Indonesian spice trade, to appreciate these marvels of nature.

Check out  [febri.suki](https://www.instagram.com/febri.suki) for more underwater photographs.

— written by **Febrienne Sukiato**



Tessellated boxer crab (*Lybia tessellata*)

Also affectionately known as the pom-pom crab, these animals collect small sea anemone in their claws to 'punch' their prey and stun them. This individual was carrying a clutch of eggs.



Bryozoan goby (*Sueviota bryozophila*)

This beautiful photograph was taken by my mother. This goby lives in the White Lacy Bryozoan colonies. It was only recently described in 2016.

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Anker's whip coral shrimp (*Pontonides ankeri*)

Little cryptic invertebrates are a feature in muck diving.
This small shrimp typically lives on whip corals.



Squat shrimp (*Thor amboniensis*)

These shrimps are also known as 'sexy shrimp' from the way they shake their behinds. Plentiful in Ambon, you'll find them in almost every anemone.



Collector sea urchin (*Tripneustes gratilla*)

Collector urchins use their sticky feet to carry debris on its body to hide from predators. This one has decided on some Indian almond leaves for its disguise.



Striated frogfish (*Antennarius striatus*)

Ambon is well known for their sheer number of frogfish. We were lucky to spot a courtship ritual and the eventual spawning that occurred.

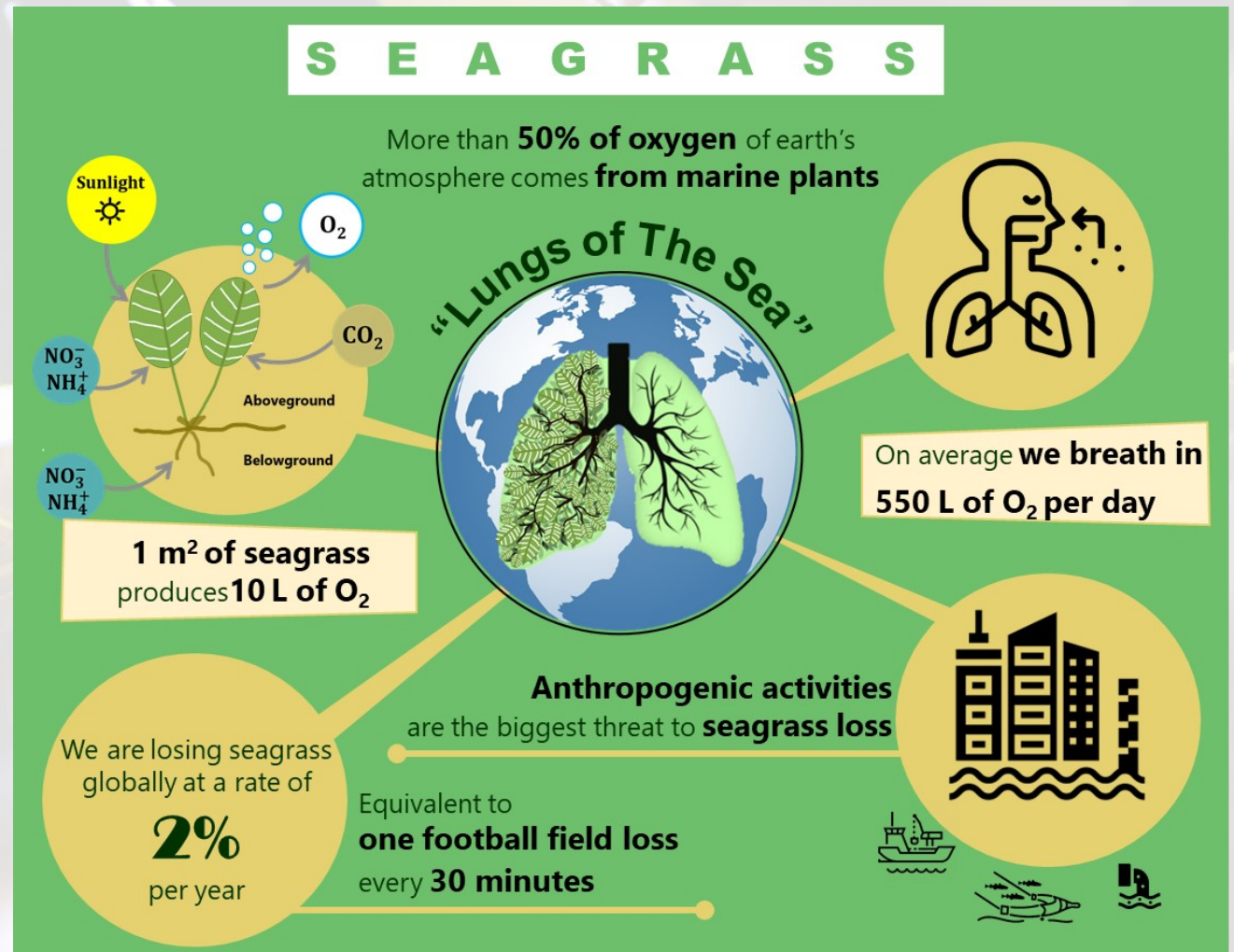
DON'T TAKE MY BREATH AWAY

Ebullition (noun)
/e-be-'li-shen /

1. a seething or overflowing, outburst.
2. the act or process of boiling up or bubbling up.



Ebullition of oxygen from seagrass can be observed when oxygen generated through photosynthesis are supersaturated.



By Nina Ho, Harris Heng & Asilah Awang

MAMAK SESSION

The term 'mamak' is widely used to describe a person with Tamil Muslim origins in Malaysia. Mamak stalls refer to the food stalls owned by members of that community, which remain open until the wee hours of the morning. The mamak culture is extremely popular among Malaysian who find these places comfortable and affordable to hang out with friends during the night, sipping on teh tarik while catching up on the latest gossip or to just chat.

Here, we offer a place for Malaysians marine community to share their stories and thoughts, creating a space for discussion to generate new ideas. This round, five young marine researchers with different backgrounds were invited to share their stories.



Lee Li Keat (Keat) - *Molecular Ecologist*

Monkey that chooses the reefs over trees. I cut, I PCR, then I peek into the code of life in giant clams and its symbionts. Most important, I vow to protect them.

What inspired you to be a marine scientist?

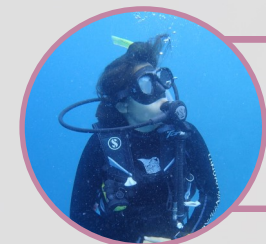
Keat: The mysterious deep blue and the life beneath yet to be explored. The fact that we humans have already been to space, but not yet able to fully explore our own oceans is intriguing.

Lim Kah Kheng (Ken) - *Marine Biologist*

Ocean geek who travels around the globe to discover exciting marine sciences. Leaving carbon footprint alongside with DNA extractions of mangroves, nudibranchs and giant clams.



Ken: NatGeoWild and my backyard. The documentaries and sightings of dolphins inspired me to have a close encounter with them.



K.L. CHEW (K.L.) - *Conservationist*

Nemophile and thalassophile.
Fervent critter and plant observer.
A solivagant feeling fernweh during the pandemic.

K.L.: An attraction to the ocean, but it wasn't something I identified until much later.

Lee Li Chuen (Chuen) - *Coral reef biologist*

Evolutionary biologist wannabe, always wanting to figure out how corals survive and adapt in the barren ocean. How vital they are in the marine ecosystem.



Chuen: My tuition teacher and also my mom. They exposed me to the marine world from a young age. My mom bought a lot of encyclopedias for my brother and I since we were young.



Haris Zulfadhli (Haris) - *Coral Climatologist*

I like the sea so much that I have blubber. Constantly stuck between the field and the lab. I mainly work behind a computer but I do get my fair share of field work thanks to my colleagues.

Haris: Long story short, my parents chucked me into the sea when I was young, I liked what I saw and decided to become a marine scientist.

Share one unforgettable story about your research.

Keat: When I spotted a rare giant clam species and a clam with mixed colour morph (possible hybrid) for the first time in the Sibutinggi archipelago, Johor. Well, for the rare species *Hippopus hippopus* (aka bear paw clam, horse's hoof clam, or strawberry clam), it was considered locally extinct in many areas (including Malaysia). However, a wild population of more than 10 was spotted in Sibutinggi archipelago!! How exciting! As for the mixed colour morph, it could be hybrid. Mind you, hybridisation of species in the wild is extremely rare. The suspected hybrid could be a clam changing colour due to environmental cues (think of it like camouflage), and the secret stems from...Well, that is a story for another time. Stay tuned!



*Colour morph of brown with hints of neon blue mantle for *T. crocea*.*



*Blending in. The rare species of giant clam, *Hippopus hippopus*.*

Ken: I got a turtle's love bite on my right foot. During a sampling trip at Mabul Island, Sabah in 2015, I was just removing a wet towel covering a female hawksbill on a research vessel (to reduce the

stress level), and she just decided to bite whatever she saw in front of her, i.e. my sexy, not so hairy foot. Maybe she sensed a strong testosterone there, sigh...



K.L.: While engrossed in a coral reef survey, I was scared out of my wits by a very inquisitive adult black tip reef shark (~1.5 m in length) that came too close for comfort, flipper smacked on the head by a juvenile green turtle and snout booped by a sea krait on my mask.

Chuen: Erm, it would be spending several nights consecutively in the labs for an experiment. It was an exciting experience because I had to plan ahead. I worked overnight from Friday to Sunday. A 3 days 2 nights lab-camping. The quiet nights allowed me to focus on my experiment. Definitely will do it again in the future.

Haris: The first few months into my research were honestly some of the most memorable for me. I started out knowing little about how to process gridded satellite data, save for what I learned from a brief R workshop and my Bachelor's thesis, and gradually had to learn more about many aspects of my study. The process of learning and developing a new skill during the first few months of my study became a memorable experience.

What skill do you think is important for future marine scientists?

Keat: Data programming and writing skills are important but so is cooking skills. Before you have the energy to do anything of research, whether you are in a high tech lab or in remote islands, you must be able to cook up some hearty and delicious meals.

Ken: I would say technical computational skills like R, modelling and bioinformatic skills.

K.L.: Programming skills to use different softwares to collect and analyse data are definitely important technical skills to possess. However, communication skill ranks on top for me. Scientists never work alone! Teammates, supervisors, lab technicians, local communities, government agencies, research partners and sponsors or grant providers - these are the people that you need to work with throughout your career. You need to be able to communicate the importance of your research to various stakeholders. A strong communication skill ensures career longevity.

Chuen: Programming and data science are useful.

Haris: I think coding is useful, using R in particular. With a base understanding, it's possible to reproduce intricate analysis methods based on scripts shared by scientists.

What's your favourite marine animal?

Keat: I am going with the subject of my research-the Giant Clams. If you think the oysters you eat are big, look up on true giant clams. Prior to my research, I had no idea that the clams that we eat every

day have an extant family that can grow up to 1 m (I bet most of you don't know about it too). And their mantle colour is just beautiful, pure art of nature.

Kheng: Orca (the killer whale) because I want to be the "Whale" in Black.

K.L.: *Costasiella kuroshimae* a.k.a sea sheep or leaf sheep. These adorable artichoke-like sea slugs only grow up to 1 cm. They are known for their sweet little sheep-like faces and luminous colour. With its voracious appetite for algae, these sap sucking slugs can retain the chloroplasts from the algae they feed on, enabling them to indirectly perform photosynthesis.



Chuen: Whales — majestic and gentle giants. Never seen one in real life and it really amazes me how these enigmatic giants with their gargantuan size are so benign in nature. They freely roam the oceans in their social group. These highly intelligent creatures even developed their own language (acoustic repertoires)!

Haris: My favorite marine animal, or group of animals to be precise, are sharks. I find it amazing that some species have basically remained seemingly unchanged for millions of years and I find that there is a certain majesty to the larger species that can grow to the size of school busses.

FEB 29

43rd Annual General Meeting.



MAR 3 - 5

Coastal and Marine Biodiversity Expert Group Consultation Workshop

- In collaboration with WWF Malaysia.
- To identify Ecological and/or Biological Significant Marine Areas in Malaysia which ought to be prioritized for protection.
- To develop recommendations for inclusion in the 12th Malaysia Plan and the 4th National Physical Plan on coastal and marine environment conservation and management.



MAR 2

R workshop for Beginners

- To provide young researchers with a basic understanding of R.
- Tutored by Dr Cheah Wee.



MAY 19

Attended meeting organised by **Department of Environmental** regarding Term of Reference Adequacy Check (**TORAC**) for Terms of References (**TOR**) on construction of new airport on

Invited as Panel Member for **Forum Webinar Pengakap Laut Malaysia Siri#3** in conjunction with World Ocean Day 2020.

JUN 25