Research Section Newsletter

Quarter 2 of 2020

What's new?

Meet our new Principal Fisheries Scientist:

Dr. Ameer Ebrahim,
Principal Fisheries Scientist

Ameer Ebrahim is passionate about the marine environment and has recently conferred his PhD Doctorate by the University of Queensland, Australia.

He has carried out extensive research around the inner islands of the Seychelles archipelago since 2015, and has been involved in the recent sea cucumber project (SEACUSEY) as Project Manager with the Seychelles Fishing Authority (SFA).

Prior to this, he worked alongside leading Marine Scientists in Australia in a shark tagging programme, and conducted research in the sustainability of Blue Carbon habitats with the Australian Rivers Institute and the Gold Coast City Council.

He is also a published scientific author, with several scientific papers on his research conducted in Seychelles and Australia published in leading international journals.

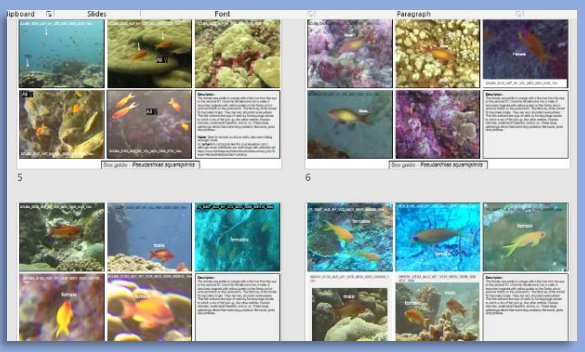
Meet our new intern:

Ms. Athina Fanchette, an S4 student from Beau Vallon Secondary School, will be with us every Thursday and Friday for a period of 2 years. She is currently following the General Education and Skills Development Pathway – Work based learning Programme. She is passionate about navigation and sea life. Athina will be working closely with the L'Amitie crew and the Research Section.

Ms. Athina Fanchette

Nekton Fish Identification:

Our team has been busy working on the fish species identification obtained from video data during the Nekton mission in the Indian Ocean.



World Oceans Day

The World's Oceans days was celebrated on the 8th June 2020. On this day, we highlight the importance of research for the conservation of our blue planet. Thanks to the dedicated members of our research team for all the hard work in supporting the wellbeing of our ocean.

Figure 1: Group photo before a survey (Marie, S. 2020).

Figure 2: Under water transect survey (Woodcock, R, 2020)

Celebrate with us and pledge in honor of oceans;

- **Pledge #1 - Choose biodegradable or reusable products**
- **Pledge #2 - Consume local organic products**
- **Pledge #3 - Manage waste disposal**
- **Pledge #4 - Efficient energy consumption**
- **Pledge #5 - Say no to single use plastics**

An interview with Mr. Melanie

Meet Rodney Melanie, a dedicated Fisheries Research Technician with 15 years of experience at the SFA.

What does your job entail Rodney?

"Basically, my job focuses mainly on marine research projects, assisting local and international scientists working on various projects in the Seychelles waters. It involves lots of field work, data collection, lab work, SCUBA diving, and working in remote areas onboard the research vessel, R/V L'Amitié.

Over the years, I have undergone numerous trainings abroad in various areas such as Taxonomy- to identify cartilaginous fish species, Sharks and rays, Otolith processing and reading, as well as working on different research vessels alongside international scientists".

How important is marine research?

"Marine research is important as it helps the Authority to better manage our resources and ensure sustainability, as well as generating scientific information about the marine species for long-term fisheries management".

What is your greatest experience?

"My greatest experience was diving amongst a pod of dolphins and they swam really close to me. It felt truly amazing! Indeed, it was a once in a lifetime experience and encounter. Another amazing experience, was working onboard the Fridtjof Nansen research vessel for one month alongside international scientists surveying the Mascarene plateau".

What truly inspired you to contribute towards the well-being of our ocean?

"I want the future generations to be able to see our ocean as the treasure it is now, and not one that has been tremendously exploited for its resources. If we are not careful, the species we have today may not be there tomorrow!"

Algal Bloom across the Amirantes islands?

Earlier last month, our research team was informed about a swirly discoloration in the sea water across Amirantes islands of Darros by our local fishermen.

We explained this fascinating, yet deadly phenomenon, as the "Algal bloom".

Algal bloom has occurred several times in the Seychelles either on a small or large scale. It is recognized by massive discoloration of the water ranging from green, yellowish-brown or red, from the excessive propagation of the phytoplankton. This event is caused by a range and combination of environmental factors such as upsurge of nutrients (phosphorus and nitrogen), temperature, sunlight, ecosystem disturbance, hydrology and water chemistry.

Some phytoplankton species produce toxins which are dangerous to human health, but even the non-toxic blooms have environmental and economic impacts.

Figure 5: Ariel photography of algal bloom in the Seychelles during October 2015. Retrieved from Seychelles News Agency
http://www.seychellesnewsagency.com/articles/3987/New+samples+needed+for+more+accurate

Figure 6: Collecting the discolored sea water sample at Providence Port with the fishermen.

Figure 7: Fisheries technician – Hemma identifying the potential algae in the discolored water sample, using a compound microscope (Vidot, A. 2020).

Did you know?

Algal bloom makes remarkable swirly satellite imagery of oceans and lakes. It can even be spotted out in space.

Demersal & Semi-industrial fish sampling

Due to the pandemic, sampling for length frequency for demersal and semi-industrial fish species has been challenging. The Research Fisheries technicians had to adapt to the new situation and worked persistently to ensure the data was still collected. Only semi-industrial species were sampled for this quarter (Figure 8).

A total of 89 fish species were sampled which includes Swordfish (36), Yellowfin (42) and Big Eye tuna (11). The minimum size range was 30-35cm with the maximum size of 165-170 cm (see Figure 9).

None of the demersal species were recorded during sampling and the number of fish sampled are below

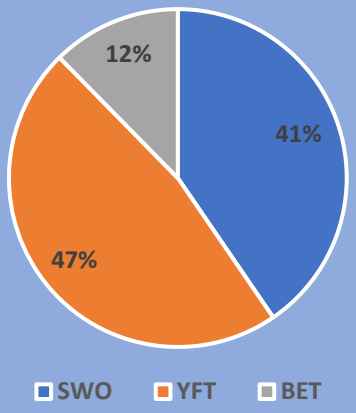


Figure 8: Total percentage of semi-industrial species (Swordfish, Yellowfin & Bigeye tuna) sampled during April - June 2020.

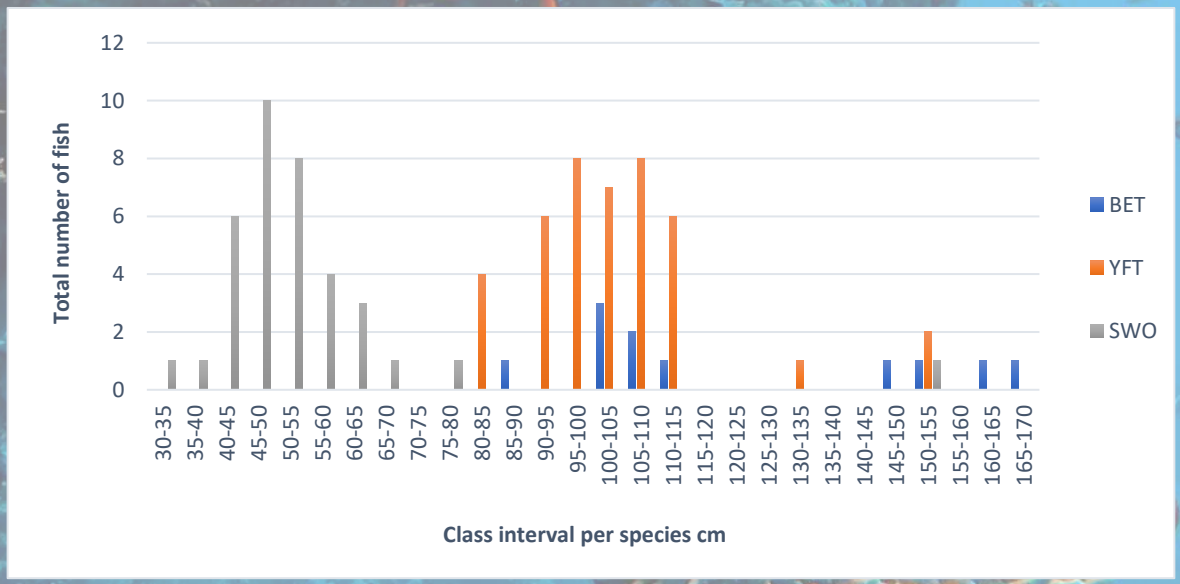


Figure 9: Total number of semi-industrial fish species (Swordfish, Yellowfin & Bigeye tuna) sampled per size class for April – June 2020.

Tuna Biological Sampling

The Tuna Biological sampling at the Indian Ocean Tuna (I.O.T) factory resumed in early May after the pandemic lockdown. Data collection of total weight and length, organ weight, stomach content, and gonad maturity stages of the three major commercial tuna species were undertaken.

- Skipjack (SKJ) *(Katsuwonuc pelamis)*
- Patudo (BET) *(Thunnus obesus)*
- Yellowfin (YFT) *(Thunnus albacares)*

A total of 415 tuna sample were collected which includes 235 Yellowfin (YFT), 135 Skip Jack (SKJ) and 45 Big Eye (BET).

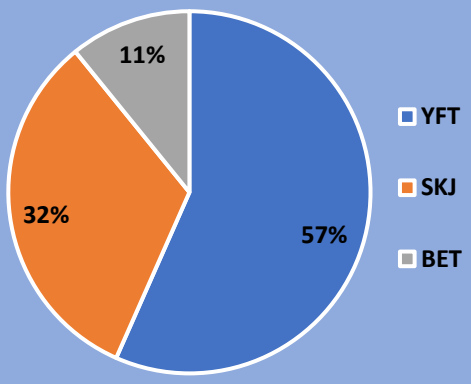


Figure 10: Total percentage of tuna species of Yellowfin (YFT), Skipjack (SKJ) and Bigeye (BET) sampled during April - June 2020.

Figure 11: The research team heading for tuna biological sampling at the Indian Ocean Tuna factory (I.O.T).

Dropline Survey (2nd phase)

The Dropline survey aims to determine the potential for dropline fisheries on the drop-off (photic zones) of the Mahé plateau and the region of the Western Indian Ocean. Providing critical parameters for development and management of the fisheries resources.

The objectives of the surveys are: (a) to define the distribution and species composition of deep slope resources in pre-determined areas; (b) to estimate biomass and maximum sustainable yield, (c) to determine key life history parameters and spatial stock structure for their assessment and management(d) to determine sex ratios in between the different survey sites (e) to determine nutritional composition of the fish species caught, (f) to determine the variability in mercury levels, (g) determine the trophic ecology of the fish species caught.

The second phase of the project was to survey 9 fishing stations along the North and North west edge of the Mahé Plateau (figure 12).

Unfortunately, the survey could not be completed as the monitor of the echo-sounder onboard R/V L'Amitié failed to function. The echo-sounder is crucial in this survey as it defines the depths at which the different species are caught and the ranges at which the droplines are to be set. As one of the research hypotheses, we assume that depths significantly influences abundance, diversity of the fish assemblages along the drop off.

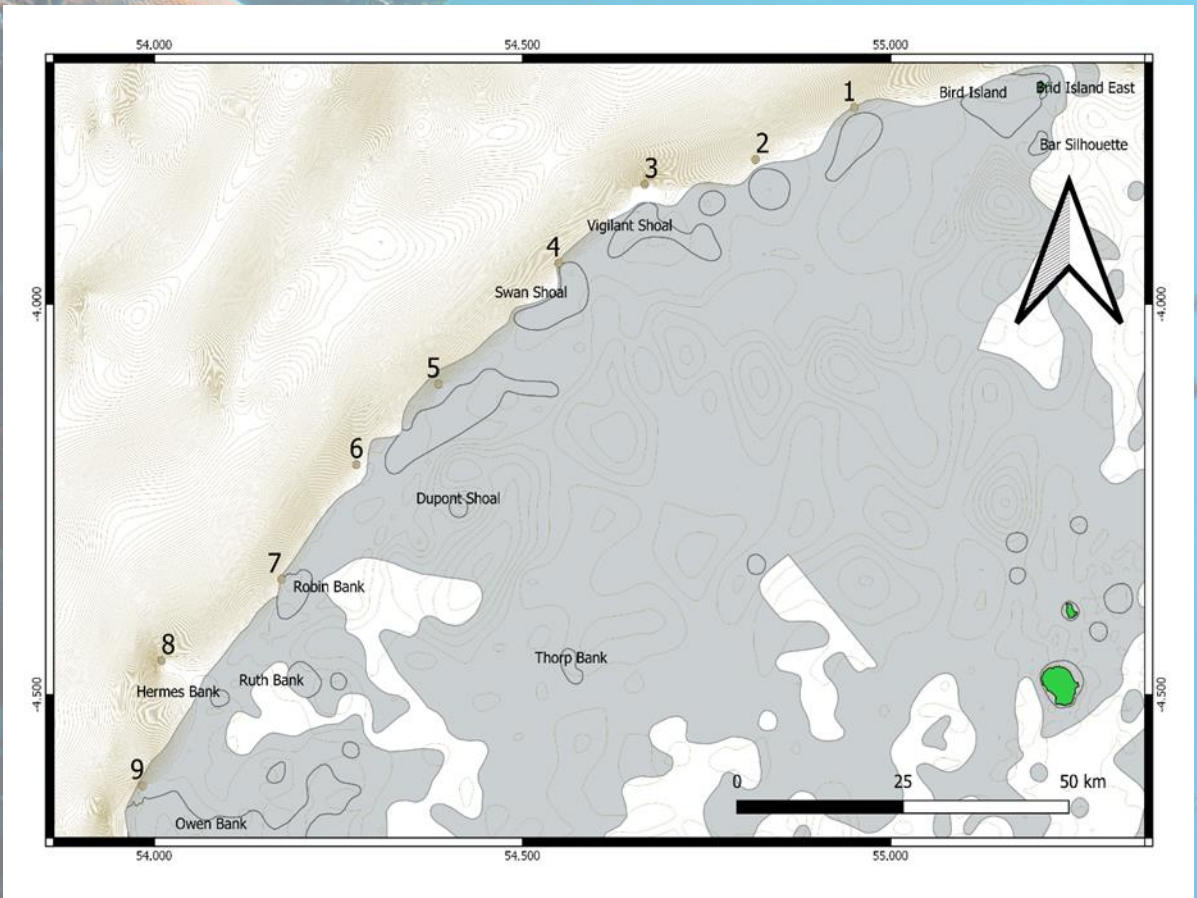


Figure 12: Display the 9 fishing stations along the North and North west edge of the Mahé Plateau (Souffre, A. 2020).

Figure 13: Images from the first phase Dropline Survey (Gabriel, K. 2020).

Histology reading

Histology research.

The study of tissues and their structures under a microscope.

Histology assess the reproductive stages of fish gonads (eggs) upon capture (mortality) indicating whether the fish was immature (never spawned) or mature (recently or actively spawning). This is a key indicator of fish population health and important to derive minimum size of capture base on the size at maturity.
By analyzing the gonads, we look out for **maturity markers** which includes;

1) Brown bodies
2) Muscle bundles
3) Residual hydrated oocytes
4) Thick ovary wall
5) Disorganized structure
6) Many blood cells

Immature fish (Figure 14):

- Maturity makers not present or visible.
- Only immature cells present;
  - Primary growth (PG)
  - Cortical alveoli (CA)
  - Early yolk (EY) – developing gonads

Mature fish (Figure 15):

- All or some maturity markers present.
- Advance yolk (AY) to Post Ovulatory Follicles (POF).

Histology reading is very time consuming; one is likely to spend hours with a microscope and it requires a good skill and reading ability. Therefore, a histology guide is used to facilitate the reading.

Gonad stages.

Gonads have different development phase. The most advanced maturity stage identified is taken as the maturity stage of the individual.

As the fish matures the gonads becomes larger with many oil droplets (energy reservoir) and yolk granules (contains nutrients) for offsprings.

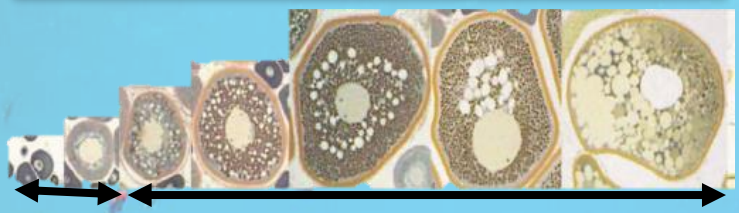


Figure 14: Development stages and progression of oocyte (also known as egg) until ovulation (releasing of eggs) (Susan et al., 2011).

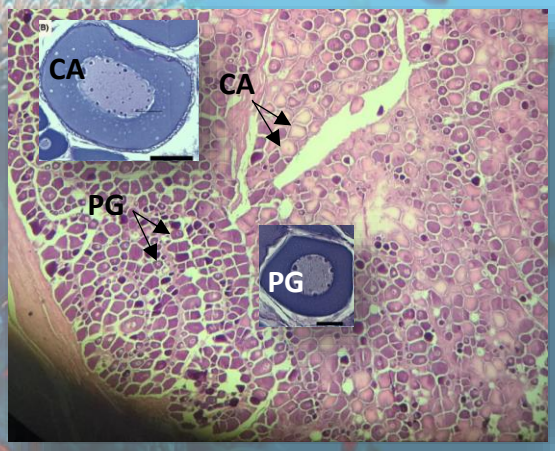


Figure 15: Histological section displaying the interior of a carangid (karang) gonad under a compound microscope Immature female with presence of PG and CA. (Gabriel, K. 2020).

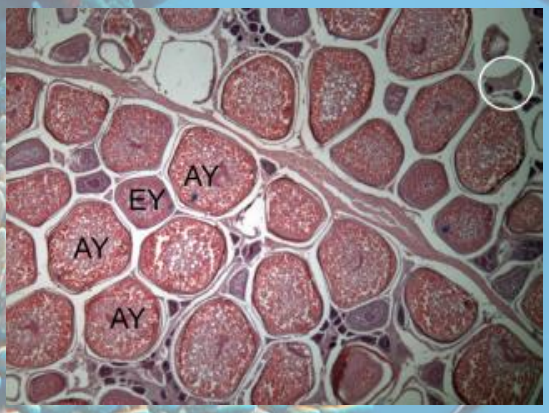


Figure 16: Historical section of a mature female (active spawning) with AY and POF (white circle). A POF is what is left behind when an egg is ovulated (released from its follicle (Farley et al., 2015).

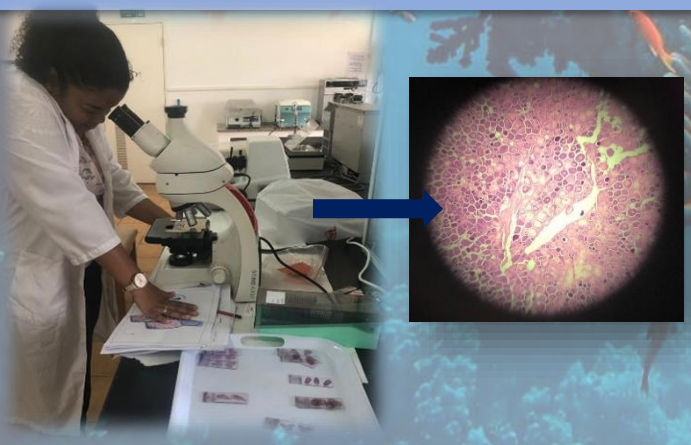


Figure 17: Fisheries scientist – Kettyna conducts the histology readying (Gabriel, K. 2020).