



## Marine Biotechnology Building To Finish by Autumn 2018!

The building construction continues and is slated to be finished in early 2019, and will house the new Marine Biotechnology laboratory, as well as serve to host new undergraduate and graduate students completing their degrees. The necropsy lab currently situated in a temporary building next to the main building, will be moved there and supervised under Dr. Danny Morick.



In other news, Dr. Dan Tchernov has been promoted to Vice President of External Relations in the University of Haifa, as well as being accepted as a Professor within the Department of Marine Biology.



His recent missions, since our last newsletter, have been to promote the MKMRS within our Kibbutz Sdot Yam, by setting out a lecture series by our staff, taking on kibbutz

members as volunteers to our different labs, and various other activities. All the staff congratulate the Professor and are excited to build a long-term relationship with the kibbutz.



### Spotlight on:

Prof. Michael D. Krom, Senior Research Scientist, Marine Geochemistry lab

I am a marine environmental geochemist with a special long-term interest in the nutrient chemistry of the Eastern Mediterranean. I was trained in Cambridge as a Geologist and Chemist at the same time as plate tectonics was being invented. When I tell that to my students, they look at me as though I am dinosaur – can anyone be that old? After Cambridge I did my Ph.D. in Edinburgh and a post doc in Yale, when I first became interested in the marine system.

After Yale, our family moved to Eilat to work on developing sustainable mariculture systems at the National Mariculture Centre. It was quite a culture shock moving from Yale to Eilat! My initial interest in the chemistry of the eastern Mediterranean came in the late 1980's when I worked at the IOLR labs in Haifa and carried out some of the first studies on the unique environmental properties of our very special sea. I have been working on that subject on and off since 1990, including during the time I was a faculty member at the University of Leeds in England.

In 2012, my wife was offered the chance to be a founding member of the new medical school in Safed and so we moved back to Israel to live in Rosh Pina. That gave me the opportunity to finish my career off here in Israel working again full time on the Eastern Mediterranean. Thanks to the help and generosity of the Morris Kahn Marine Research Station, I now have the chance to finally make world class nutrient measurements across both the Israeli shelf and offshore. Our new data is finally answering questions about how the biological system responds to the unique chemical environment of this P starved part of the ocean. I am also privileged to be given the chance to teach a new cohort of students and hopefully to transfer some of my knowledge and passion about the Mediterranean.

## Wrapping up Season 3 – A tale of success and determination!

Dr. Aviad Scheinin

The creation of the Top Predator LTER (long-term ecological research) station in Ashdod, as part of the Morris Kahn Marine Research Station, is progressing. A meeting with the Mayor of Ashdod took place and he gave his blessing to the collaboration. Here is a summary of results from our top predator research:

Sharks and Rays:

- End of Hadera shark tagging season: 11 Female Dusky Sharks, 5 Males Sandbar Sharks. 13 acoustic tags were implemented as well as 4 satellite tags. 2 females were checked with ultrasound for pregnancy, one successful check showed pregnancy. 27 aerial drone surveys were done this season and are currently being analyzed.
- We have started an assessment on the effect of anthropogenic pressure on the shark aggregation in Hadera.
- We are part of a partnership of trying to regulate the use of the seasonal Hadera shark aggregation.
- We had a surprising sighting of guitarfish during a routine off-season survey, which led to the catch and tagging of 15 guitarfish.
- A new paper titled 'Automated analysis of marine video with limited data' on our aerial surveys of sharks has been accepted for publication.



## Marine Mammals:

- An UAV (unmanned aerial survey) platform is under development together with Eviation (a small company based in Israel), the Department of Marine Technologies (University of Haifa) and engineers from the Technion Institute. Six aerial surveys were performed in the planned MPA (marine protected area) in the southern part of Israel. Data on sea turtles, jellyfish and macroplastics is also being collected.
- A new manuscript titled 'Detection of *Toxoplasma gondii* in three common bottlenose dolphins (*Tursiops truncatus*); a first description from the Eastern Mediterranean Sea' has been accepted for publication.
- Aviad Scheinin and Eyal Bigal took part in the 32th European Cetacean society conference held in Italy and presented the Morris Kahn Marine Research Station's data.

## Bluefin Tuna:

- Tuna season started in early May with many meetings being held with the fishery department and commercial tuna fishermen in preparation for the coming season. We plan to collect more data and satellite tag 3 more Bluefin Tuna fish!

## **Molecular identification and characterization of pathogens in wild and mariculture fish from the eastern Mediterranean**

*Prof. Michael Krom*

The Eastern Mediterranean is known for the extreme oligotrophic conditions which result from the unusual circulation bringing nutrient poor surface waters from the Straits of Sicily while underneath, nutrient rich deep waters flow out. Therefore, even as the Eastern Mediterranean is an inland sea with large pollutant inputs, the circulation was shown to reduce their effects on nutrient availability.

As a part of the marine research station monitoring program, and in cooperation with the Marine Chemical Ecology Lab (Dr. Daniel Sher), the biogeochemistry lab is taking part in monthly sampling cruises to the THEMO "real-time" marine observatory stations located off Achziv marine nature reserve. We are also sampling bimonthly along a transect (10-100 meters depth) off the shore of Sdot Yam. The water samples are brought to the laboratory and analyzed fresh within 12-15 hours from sampling. Using an ultra-sensitive auto-analyzer equipped with a long flow cell, we are able to produce

very high-quality results at nanomolar concentrations. We aim to produce an annual data set which will reveal the nutrient dynamics in the Eastern Mediterranean.

The data shows there is no phosphorus in the upper layers of the water column, while nitrogen remains at a ratio of N:P  $\gg$  16, suggesting a phosphorus-limited system.



## *Sediment microbial communities along the continental shelf of the East Mediterranean Sea*

Dr. Dalit Meron

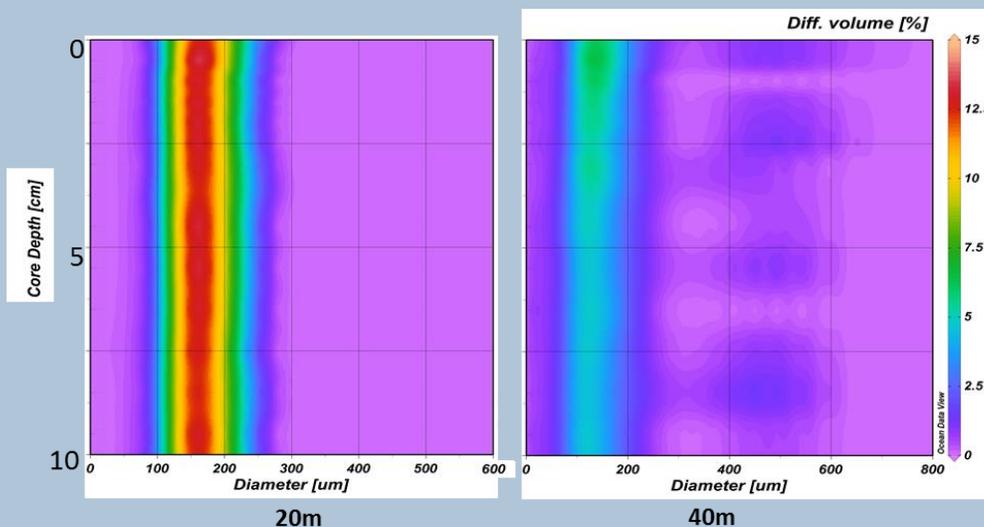
Microbes are an important part of the ecological system and the population structure of the microorganism changes within the environment. Surface sediment bacteria also play a significant biogeochemical role in marine ecosystems due to their high abundance relative to the overlying water column. Monitoring the sediment microbial communities along the continental shelf will enable us to create an updated database (our knowledge so far is very limited) and in the future develop microbial-molecular indicators to observe further changes following environmental changes and/or anthropogenic impacts.



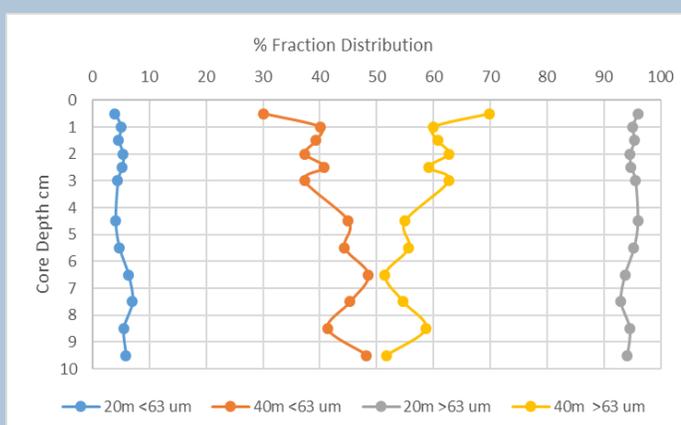
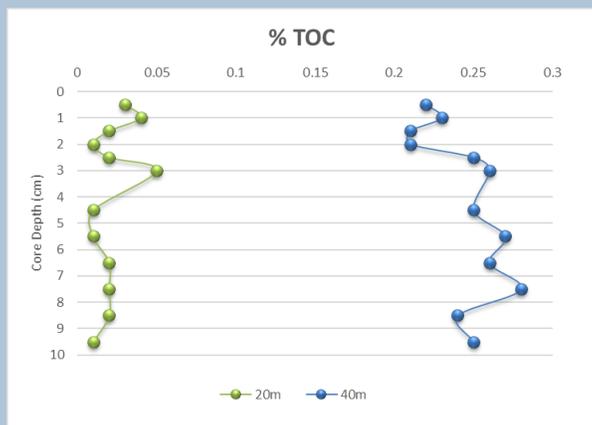
## Preliminary results

As part of the water depth transect in Sdot Yam, four depths were sampled (20, 40, 80 and 100 m). DNA of the core samples were extracted and analyzed in order to characterize the bacterial, archaeal and eukaryote communities. Each core was split to 12 slices (up to 10 cm), to ensure we have both water and sediment core depth gradients. In addition, % TOC (total organic carbon) and grain sizes were analyzed from each site.

When comparing two depth sites (20 and 40m), we observed a significant difference between the sites in grain sizes and % TOC. The grain size at 20 m contained only ~ 5% silt (< 63  $\mu\text{m}$ ), while at 40 m the silt fraction is more significant (41%). The grain size composition at 40 m contains a total higher percentage of smaller particles (Figure 1, 2), that may explain the higher percentage of the % TOC (Figure 3).



A significant difference is also observed between the sites when comparing the sediment microbial communities (Figure 4). In all communities, bacteria (a), archaea (b) and eukaryote (c), there was a significant division according to water depth. In addition, the samples in each depth are organized in gradient according to the core slice depth. These preliminary results indicate the sensitivity of the microbial communities to the environmental conditions. In this case, the change in water depth is highlighted. However, we can assume the observed changes are also connected to other parameters (e.g. different geographic locations,



seasons and disturbed sites). The gradient of the core slices depth may indicate moderate changes in abiotic parameters across the depth layers. Continuing from this, more depth sites will be analyzed (80 and 100 m) to complete the first gradient, and in future, more sites will be sampled (different locations, disturbed sites, etc.) to better understand the sediment microbial communities and site health.

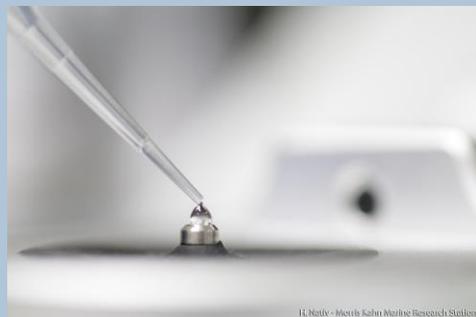
## **Molecular identification and characterization of pathogens in wild and mariculture marine fish from the eastern Mediterranean**

Dr. Danny Morick

Pathogen prevalence of fish diseases are examined as part of the Mediterranean monitoring program. In the last few months we are focusing on *Vibrio* spp., *Mycobacterium* spp., *Streptococcus* spp. and Nervous Necrosis Virus (NNV), all of which are known as a major causes of fish loss, occasionally to the extent of being a limiting factor. Although wild fish are economically and ecologically important, prevalence of these pathogens in the wild fish populations of the Levant Sea is largely undocumented. We aim to provide a baseline of pathogenic baseline data by identifying the bacterial and viral pathogens and their prevalence in eastern Mediterranean teleost and crustacean species. We will then compare pathogen prevalence in different animal internal organs, between wild and cultured fish populations and between in different geographic locations.

Eight wild fish species were collected from four areas along the Israeli Mediterranean coast (two in the north and two in the south) and one culture fish species (*Sparus aurata*) was collected from fish farm.

Tissues from brain, liver and kidney were sampled and extracted (DNA and RNA) for the detection. Quantification of pathogens is done by using PCR and real time PCR (qPCR) with specific primers. Preliminary results show brain, liver and kidney samples of several species from different locations were found positive for *Vibrio harveyi*, NNV, and *Mycobacterium* 16S by PCR and were confirmed by sequencing.



## Publications accepted:

Bigal E, Morick D, Scheinin A, Salant H, Berkowitz A, Elad D, Melero M, Goffman O, Roditi-Elasar M, Levy Y, Tchernov D. 2018. Toxoplasmosis in three common bottlenose dolphins (*Tursiops truncatus*); a first description from the Eastern Mediterranean Sea. *Veterinary parasitology*, in Press.

Chen, Nengwang & D.Krom, Michael & Wu, Yinqi & , DanYu & Hong, Huasheng. (2018). Storm induced estuarine turbidity maxima and controls on nutrient fluxes across river-estuary-coast continuum. 10.13140/RG.2.2.25484.82562.

Levy, D. Belfer, Y., Osherov, E., Bigal, E. Scheinin, A.P., Nativ, H., Tchernov, D. Treibitz. 2018. *Automated Analysis of Marine Video With Limited Data* ,IEEE Proc. Computer vision and pattern recognition. Workshop on Automated Analysis of Marine Video for Environmental Monitoring

Mannocci, L., Roberts, J.J., Halpin, P.N., Authier, M., Boisseau, O., Bradai, M.N., Cañadas, A., Chicote, C., David, L., Di-Méglio, N. and Fortuna, C.M., 2018. Assessing cetacean surveys throughout the Mediterranean Sea: a gap analysis in environmental space. *Scientific reports*, 8(1), p.3126.

Milstein, A., Levy, A., Neori, A., Harpaz, Sh. Shpigel, M., Guttman, L. 2018. Water quality, ecological processes and management procedures in a periphyton biofiltration system in mariculture: A statistical analysis. *Aq. Res.* <https://doi.org/10.1111/are.13604>

Nobre, A.M., Valente, L.M.P., Neori, A. 2018. A nitrogen budget model with a user-friendly interface, to assess water renewal rates and nitrogen limitation in commercial seaweed farms. *J Appl Phycol.* DOI 10.1007/s10811-017-1164-9

Neori, A., Shpigel, M., Guttman, L., Israel, A. 2018. Development of Polyculture and Integrated Multi-Trophic Aquaculture (IMTA) in Israel: A Review. *The Israeli Journal of Aquaculture - Bamidgeh, IJA\_69.2017.1385*, 19 pages



*This is the second publications detailing our activities since January 2018 at the Morris Kahn Marine Research Station. We thank you for your kind generosity and support as our marine research and objectives take shape!*

*Thanks to the incredible generosity of our donors:*

*Morris Kahn Foundation  
The Crown Foundation  
The J. Isaacs Charitable Trust  
Mr. Peter Kadas  
The Helmsley Charitable Trust*

Prof. Dan Tchernov



Kibbutz Sdot Yam, Israel

