

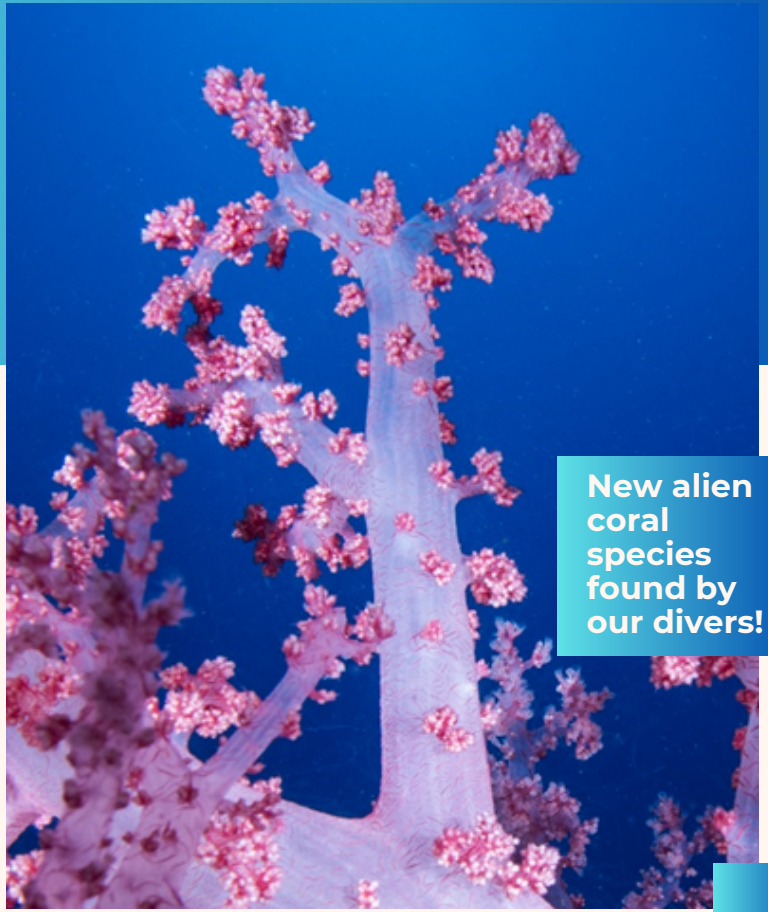
NEWSLETTER



October 2023

Find all new updates from the station over the summer, and happy Rosh HaShana to all!

Part of our shark team, led by Dr Aviad Scheinin, headed to Boncuk Cove in Turkey to teach local researchers to catch, tag, and sample a shark.



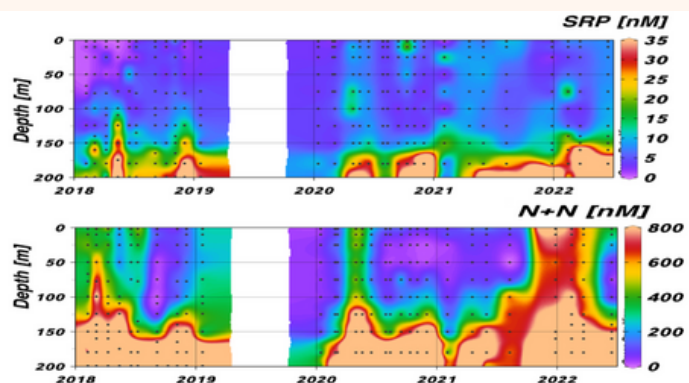
New alien coral species found by our divers!



In every issue we produce, we surface to bring the most interesting stories to your attention! Apart from the cover stories, we cover:

- Infections in stranded dolphins
- Breakthrough findings from the biogeochemistry lab
- Noticeable trends in rocky reef fish surveys and invasive species

The marine biogeochemistry students have been conducting nutrient limitation experiments to determine limitations for autotrophs and heterotrophs under relatively high nutrients in winter and low nutrients in late summer, particularly during the nutrient-depleted years of 2020 and 2021. Some results show that direct organic N (urea) uptake is significant when depleted inorganic nutrients. This compound has rarely been measured before in the nutrient-depleted sea.

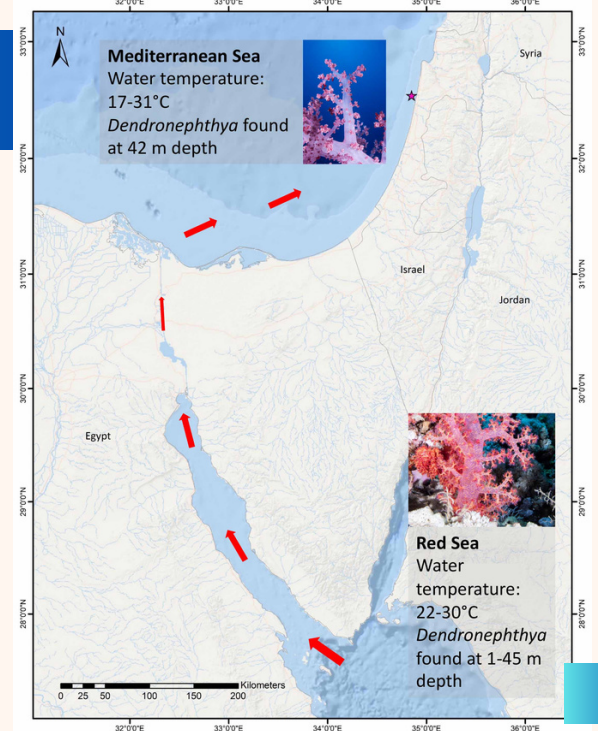


Dendronephthya reaches our shores

by Hagai Nativ



During a routine survey on May 18, 2023, our monitoring divers found *Dendronephthya* sp. colonies (cover image) and took some samples near Sdot Yam on the rocky reef. Finding this species may indicate 'tropicalization' within the Mediterranean Sea (we are currently classed as a temperate region). This will affect species currently inhabiting our region; some species will not be able to handle the heat and will need to move to deeper waters to survive. This species, a type of soft coral, has some traits that should help with its survivability and competition here in the Mediterranean. To the right, the species pathway to the Med.



Guitarfish surveys restarted!

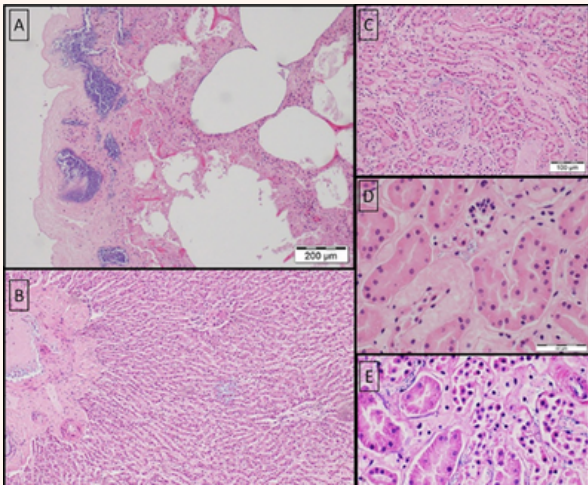
Our Master's student conducted 102 visual surveys along 11 beach sites of the Israeli coastline, with two major aggregations being identified in Kibbutz Ma'agan Michael and Evtach. We are currently worked to publish this data in support of a nursery area being defined for the former site, Ma'agan Michael. In addition, 507 fin clip (tissue) samples of juvenile *G. cemiculus* were collected and will be used for the new project with BMF.

Now, with funding from Blue Marine Foundation, we hope to conduct a research expedition to Cyprus to catch and sample blackchin guitarfish and obtain enough samples to conduct a comparative analysis. This works aims to provide further evidence to support the designation of seasonally-important habitats for the blackchin guitarfish in Israel and to define spatial and temporal 'hotspots' of juvenile

guitarfish distribution in Cyprus. To accomplish this, the research team will establish if there is local connectivity via population genetic analyses, as well as investigate genetic diversity and the phylogeographic origin of the blackchin guitarfish. As the Morris Kahn Marine Research Station has several in-house experts dealing with comparative population biology, further studies could provide initial insights on population status and health (assessing biochemistry, contamination, and microbiome of the guitarfish). We are confident in our ability to build a basis for long-term bilateral research. This project will derive meaningful results which lead to enhanced conservation and protection for this species in both countries.

NEW PUBLISHED STUDIES

MARINE PATHOLOGY



Streptococcus agalactiae in tissues of a common dolphin

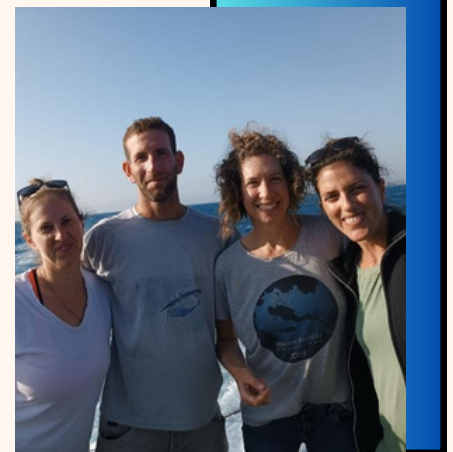
Breakthrough: **understanding microbial control on phosphorus**

The EMS is P depleted and thus controls the food chain's base directly or indirectly. However, curiously, every time we measured SRP, even directly after Storm Carmel, there was essentially no dissolved phosphate in the water column, and our 48-h nutrient limitation experiment suggested the system was N + P co-limited. As a result of reading a paper in Nature Communications by Kamennaya et al. (2020), we now know why. Cyanobacteria, the most common type of phytoplankton in our environment, have developed a way to collect even small amounts of phosphate. They store this phosphate as PPI in a specific part of their cell called the periplasm. This stored phosphate is later used to grow cyanobacteria and other cellular processes.

This discovery aligns with our regular observations and the results from the CYCLOPS P addition experiment 2003. Interestingly, the cyanobacteria do not use the stored PPI for the first 48 hours after taking it in. This unique characteristic of cyanobacteria helps explain the peculiar aspects of Tal Ben-Ezra's nutrient limitation experiments. These findings will also provide insights for similar experiments conducted in oceanic areas, such as the EMS and various offshore regions worldwide.

Following the necropsies of stranded dolphins, we have published the first report of a *Streptococcus agalactiae* infection in a common dolphin and a report of *Photobacterium damsela* subspecies *damsela* Pneumonia in dead, stranded bottlenose dolphin. The *Photobacterium* infection is caused by a common marine pathogen that affects various sea animals, including dolphins. It can lead to severe infections and high mortality rates in marine creatures like fish, mollusks, crustaceans, and dolphins. This report adds to our understanding of the health of marine mammals and also provides information about a pathogen that can infect many marine animals as well as humans.

The second case involves a bottlenose dolphin stranded in the eastern Mediterranean Sea. It had a severe lung infection and spleen issues caused by *Streptococcus agalactiae* (see image left). This infection could spread among the already vulnerable Mediterranean dolphin population. Our aim is that by studying and identifying these pathogens, we can help improve future treatments for stranded marine mammals.



Prof. Mike Krom's marine biogeochem team on the MedEx

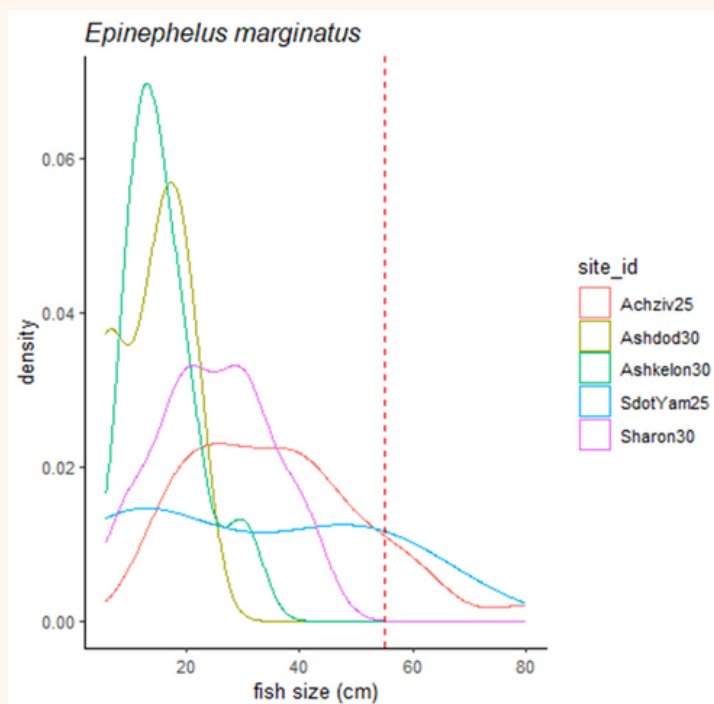
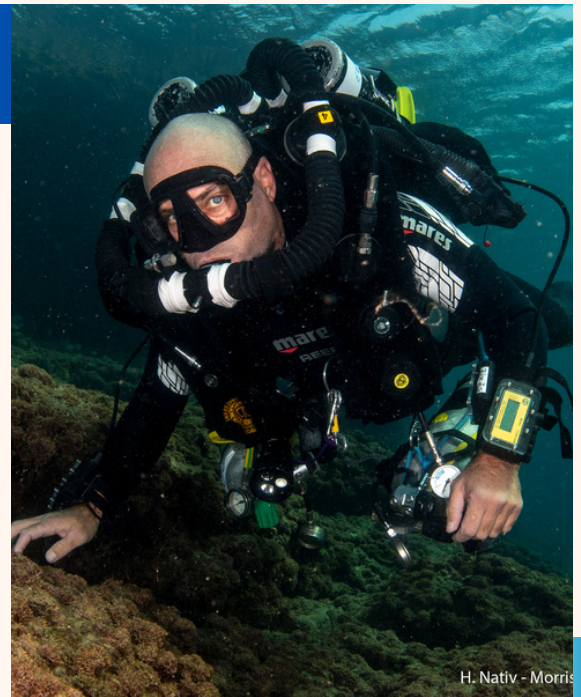
Rocky Reef Trends

by Anat Tsemel

Overview of sites

Israel's coastal rocky reef habitat is biodiverse and stable, supporting algae, invertebrates, and fish. Our understanding of this habitat has been limited, but since 2014, our monitoring efforts and the Nature and Parks Agency's Bioblitz surveys have expanded our research scope.

Starting with Achziv, Nahariya, and Sdot Yam reefs in 2014, we gathered data at depths of 10, 25, and 45 meters. In 2017, Ashdod and Ashkelon sites were added at 30 meters depth, followed by the Hasharon site (30 m) in 2019, including shallow sites (up to 4 meters) in Ashkelon, Sdot Yam, and Achziv. We conduct 4 X 25-meter belt transects at each site, observing invertebrates, algae, and fish.



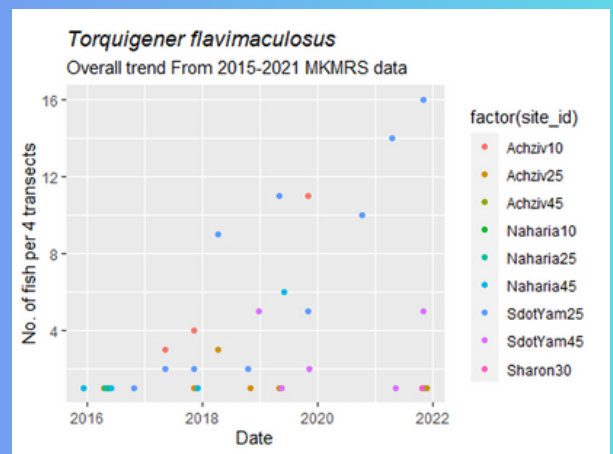
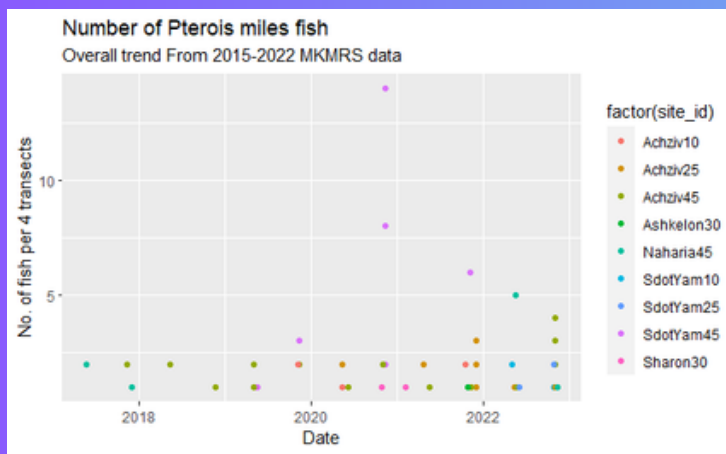
Grouper size distribution

We observed a size change in the flagship apex predator, the dusky grouper (*Epinephelus marginatus*), on the rocky reef during our surveys. This top predator's body size is smaller in the south and increases to the north, particularly at Achziv (see figure left). Data suggests sexual maturation occurs primarily at the northern Sdot Yam and Achziv sites. This difference in size distribution could be linked to the protection statuses of the sites. Achziv is a fully protected marine area, while Sdot Yam has trawling restrictions and fishing bans in May and June, and the Hof Sharon and Ashkelon sites are only safeguarded during the fishing bans. The figure left shows the size distribution of *Epinephelus marginatus* at the 25-30 m LTER stations between 2019-2021, with the dotted line indicating sexual maturation size.

Invasive species charted

From our surveying, we highlighted a phenomenon - the establishment of two invasive species, *Torquigener flavimaculosus* (yellow-spotted pufferfish), and *Pterois miles* (common lionfish). In 2015, the first year of surveying, our divers reported no lionfish (*P. miles*) across all surveyed sites. As we've highlighted in previous reports, it is likely they came from the Red Sea via the Suez Canal (see next page).





The formation of invasive populations of *Pterois miles* (left), at the study sites, and the formation of an invasive population of *Torquigener flavimaculosus*, at the study sites (right plot).

Publications

since May 2023

- **Ben-Ezra, T., Reich, T., Tsemel, A., Berman-Frank, I., Lehahn, Y., Sher, D., Suari, Y. and Krom, M.D., 2023.** Nutrient dynamics across the Israeli coastal shelf: An unusual oligotrophic coastal system. *Continental Shelf Research*, p.105103. <https://doi.org/10.1016/j.csr.2023.105103>
- **Morick D, Levy Y, Davidovich N, Wosnick N, Zemah-Shamir Z, Tchernov D, Aizenburg, I. 2023.** Pneumocoelom and secondary lung collapse treatment in a stranded loggerhead sea turtle (*Caretta caretta*) in the eastern Mediterranean Sea, Israel. *Vet Rec Case Rep.* e665. <https://doi.org/10.1002/vrc2.665>
- Bellworthy, J., Pardo, R., Scucchia, F., Zaslansky, P., Goodbody-Gringley, G. and **Mass, T., 2023.** Physiological and morphological plasticity in *Stylophora pistillata* larvae from Eilat, Israel, to shallow and mesophotic light conditions. *Science.* <https://doi.org/10.1016/j.isci.2023.106969>
- **Davidovich, N., Makhon, A., Zizelski Valenci, G., Dveyrin, Z., Yahav, T., Pretto, T., Tchernov, D., Morick, D. 2023.** Identification of *Mycobacterium pseudoshottsii* in the Eastern Mediterranean. *Microbiol Spectr.* Jun 5:e0085623. doi: 10.1128/spectrum.00856-23.
- **Starostinetsky-Malonek, T., Scheinin, A., Aroch, I., Davidovich, N., Bigal, E., Livne, L., Hauser-Davis, R.A., Wosnick, N., Tchernov, D., Morick, D. 2023.** First report on the serum chemistry and haematology of free-ranging dusky (*Carcharhinus obscurus*) and sandbar (*Carcharhinus plumbeus*) sharks in the eastern Mediterranean Sea. *Conserv Physiol.* May 30;11(1):coad037. DOI: 10.1093/conphys/coad037.
- Morick D., Davidovich N., Zemah-Shamir Z., Kroin Y., Bigal E., Sierra E., Segura-Göthlin S., Wosnick N., Hauser-Davis R.A., Tchernov D., Scheinin A.P. 2023. First description of a Gammaherpesvirus in a common dolphin (*Delphinus delphis*) from the Eastern Mediterranean Sea. *Vet Res Commun.* doi: 10.1007/s11259-023-10125-x.
- **Morick, D., Blum, S.E., Davidovich, N., Zemah-Shamir, Z., Bigal, E., Itay, P., Rokney, A., Nasie, I., Feldman, N., Flecker, M., Roditi-Elasar, M., Aharoni, K., Zuriel, Y., Wosnick, N., Tchernov, D., Scheinin, A.P. 2023.** *Photobacterium damsela* subspecies *damsela* Pneumonia in Dead, Stranded Bottlenose Dolphin, Eastern Mediterranean Sea. *Emerging Infectious Diseases*, 29(1), pp.179-183. DOI: 10.3201/eid2901.221345
- Gnone, G., Bellingeri, M., Airoldi, S., Gonzalvo, J., David, L., Di-Méglio, N., Cañadas, A.M., Akkaya, A., Awbery, T., Mussi, B., Campana, I., Azzolin, M., Dede, A., Tonay, A.M., Monaco, C., Pellegrino, G., Tepsich, P., Moulins, A., Arcangeli, A., Labach, H., **Scheinin, A.P., Mevorach, Y., Carlucci, R., Santacesaria, F.C., Chicote, C.A., Gazo, M., Tintore, B., Alessi, J., Mandich, A., Bittau, L., Bruno, D.L., Azzinari, C., La Manna, G., Silvia Pace, D., Decandia, D., Castelli, A., Nuti, S., Santoni, M.C., Verga, A., Tomasi, N., Giacomo, C., Costantino, M., Falabrino, M., Azzellino, A. 2023.** Cetaceans in the Mediterranean Sea: Encounter Rate, Dominant Species, and Diversity Hotspots. *Diversity* 15(3):321. <https://doi.org/10.3390/d15030321>
- **Nativ, H., Galili, O., Almuly, R., Einbinder, S., Tchernov, D. and Mass, T., 2023.** New Record of *Dendronephthya* sp.(Family: Nephtheidae) from Mediterranean Israel: Evidence for Tropicalization?. *Biology*, 12(9), p.1220. <https://doi.org/10.3390/biology12091220>