PRESS RELEASE

In the Gulf of Aqaba, Jordan, Israel, Sudan and Switzerland join their efforts for the sake of Red Sea corals

The Transnational Red Sea Center, a Swiss initiative bridging science and diplomacy for the study and preservation of the most promising coral "refuge" on Earth, has just completed a first scientific mission along the Jordanian and Israeli coasts in collaboration with its local partners.

Conducted with the Marine Science Station in Aqaba and the InterUniversity Institute for Marine Sciences in Eilat, as well as Sudanese researchers from the Red Sea University in Port Sudan, this multidisciplinary survey laid the foundations for the establishment of the first ever Red Sea-wide coral ecosystem and biodiversity 'baseline'.

This joint mission also included the installation of a new coral health monitoring station in Aqaba. After Eilat where a first one was installed in late 2021, this pioneering equipment is the second in a network of such stations that the TRSC and its regional partners aim to deploy at various key locations around the Red Sea.

These two developments are concrete illustrations of the science diplomacy promoted by the TRSC, with the official support of the Swiss Confederation, in favor of global warming resistant Red Sea corals thanks to a regional approach. In the short term, the mission to the northern Gulf of Aqaba will be followed by a next mission to Djibouti in September.

Aqaba/Lausanne, August 11, 2022 - In the northern Gulf of Aqaba, scientific diplomacy promoted by Switzerland in favor of Red Sea corals is bearing its first fruits, a sign of hope for the survival of reefs that have demonstrated their resistance to climate change. The Transnational Red Sea Center (TRSC), a Swiss initiative bridging science and diplomacy in favor of the study and preservation of the last "refuge" of corals on Earth, has just completed a first scientific mission along the coasts of Jordan and Israel in collaboration with the Marine Science Station in Aqaba and the InterUniversity Institute for Marine Sciences in Eilat as well as the Red Sea University in Port Sudan.

For two weeks, from the end of July to the beginning of August, a multinational team of ten scientists conducted several programs aimed at establishing over the next few years the first ever Red Sea-wide coral ecosystem and biodiversity 'baseline'.

These programs focused on coral reef population structure, dynamics, and adaptive potential through seascape genomics; the estimation of coral species assemblages through environmental DNA (eDNA) metabarcoding; assessing the metabolic response to thermal stress to increase our knowledge about fundamental cellular metabolism;

assessing the impact of plastic and trace-metal pollution on corals, and scalable 3D-mapping of shallow coral reefs with machine learning.

"The Aqaba Special Economic Zone has focused since its establishment in 2001 on sustainable development of zone through implementation of legal frameworks," His Excellency Engineer Nayef Bakheet, CEO of the Aqaba Special Economic Zone Authority (ASEZA).

"On the top of the priorities of ASEZA, is to preserve the ecosystem of corals and marine life in the Gulf of Aqaba, which is accomplished through several major and important projects, including the establishment of the marine reserve and the Aqaba Center for Marine Sciences. The best practices that are carried out by the Transnational Red Sea Center to conduct the necessary studies for the conservation is contributing to the coral reef protection," Eng. Bakheet adds.

"All these efforts are actively contribute to supporting the efforts of the Aqaba Special Economic Zone Authority in its strategy to preserve the marine environment in the Gulf of Aqaba."

In parallel to this Swiss-lead mission, a new coral monitoring station (CMS) was installed in Aqaba, strengthening in a pioneering way the monitoring of their health in the northern Gulf of Aqaba. The CMS (based on a Walz PAM system) was developed by the InterUniversity Institute for Marine Sciences in Eilat, Israel, where a first pilot CMS was installed in late 2021.

The Coral Monitoring Station consists of a set of sensors positioned at a depth of 6 meters to monitor the physiological behavior of coral colonies and several environmental parameters. It also includes an underwater camera that allows to follow in real time, via a web interface, the activity and diversity of reef fish as well as the pigmentation of corals, and if necessary to detect the first signs of a possible bleaching.

"The Marine Science Station in Aqaba is very proud to host the first CMS in Jordan, and only the second in the Red Sea," says Dr. Ali Al-Sawalmih, the director of the Marine Science Station in Aqaba.

"This pioneering tool will allow our Center and Jordan to strengthen the monitoring of the health of corals in the Gulf of Aqaba, as part of the overall policy of studying and preserving coral reefs in this part of the Red Sea supported by our authorities," said Dr. Al-Sawalmih.

The CMS records the photosynthetic performance of microscopic algae that live in symbiosis in the coral tissues by measuring the amount of fluorescence emitted by the chlorophyll pigments. Indeed, most hard corals (with a calcareous skeleton) depend on the presence of these algae in their tissues to ensure their energy supply, and thus grow and resist environmental disturbances. These algae capture the sun's energy and transform it into nutrients which represent up to 90% of the corals' energy needs.

"For the first time we are "asking the corals" how they feel about environmental change by monitoring their physiological performance at high temporal resolution, year-round, and provide real-time data to scientists and policy makers," said Prof Maoz Fine from the InterUniversity Institute for Marine Sciences in Eilat, who developed the Coral Monitoring Station.

"This serves not only for scientific purposes but also as an early warning system for managers who can act to reduce local stress on reefs when stressful conditions develop," he adds.

The deployment of this second Coral Monitoring Station in Aqaba was made possible thanks to the support of various entities, including the Ronald S Roadburg Foundation, the Red Sea Reef Foundation, and the Transnational Red Sea Center, an initiative created in 2019 at the Ecole polytechnique fédérale in Lausanne (EPFL, Swiss Federal Institute of Technology) with the support of the Swiss Confederation - as well as the involvement of IUI and MSS personals.

"The scientific mission conducted this summer in the northern Gulf of Aqaba with our regional partners and the deployment of a second Coral Health Monitoring Station are a source of deep satisfaction for the Transnational Red Sea Center," said Prof. Anders Meibom, Head of the Biological Geochemistry Laboratory at EPFL and Director of TRSC.

"These two very positive developments for the preservation of Red Sea corals have been made possible thanks to the strong support of the authorities and the coral science communities of the countries concerned and are a very strong encouragement for the continuation of our activities in the entire Red Sea", continues Prof. Meibom.

"The objective is to establish the first-ever Red Sea-wide inventory of coral ecosystem biodiversity based on standardized scientific programs, which will enable the regional stakeholders to strengthen their environmental and conservation policies for corals, which have demonstrated their exceptional resilience to climate change," he insists.

The symbiotic algae that live in the tissues of corals give them their colors. In case of stress, especially due to rising water temperatures, they are expelled, which causes the "bleaching" of the coral and then its death if the stress or the water temperature does not decrease for several weeks and the algae does not return to live in symbiosis with the coral.

The Coral Monitoring Station in Aqaba is the latest in a network of such equipments that the TRSC and its regional partners aim to deploy in key locations around the Red Sea in the coming years.

Both this new Coral Monitoring Station and the multidisciplinary survey along the Jordanian and Israeli coasts illustrate the scientific diplomacy promoted by the Transnational Red Sea Center, with the official support of the Swiss Confederation, to promote the study and safeguarding of Red Sea corals through a regional approach.

This first Swiss-lead mission in the northern Gulf of Aqaba will be followed by a next one in Djibouti in September, then in the other Red Sea countries in the following years.

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