

Citizen Scientists Against Microplastics

When lounging on a Maltese beach, admiring the azure sea, you might not realise that the Mediterranean is one of the most polluted seas in the world. It accumulates marine plastics of every size and shape, which eventually break down into smaller pieces forming microplastics, defined as plastic fragments which are just visible to the naked eye (ie shorter than 5mm in diameter). In fact, in certain parts of the Mediterranean, fine particulate matter exceeds 100 micrograms per cubic metre. This is much higher than the global average of 39.6 micrograms per cubic metre.

Microplastics, apart from being harmful in and of themselves, provide a surface where other contaminants and heavy metals accrue. Their size means that even the smallest animals, such as zooplankton, can ingest them. From the guts of zooplankton, the microplastics pass from prey to predator through the food chain, causing harm at each step, eventually reaching humans.

Microplastics are challenging to study because the tiny pieces require many hours to find and catalogue. It is only with extensive datasets that scientists can begin to understand how microplastics circulate. For example, by measuring size, colour, and the roundedness of the edges, scientists can surmise the lifetime of microplastics. The longer the microplastics circulate, the smaller, more faded, and more rounded they become.

In Malta, we find microplastics everywhere on sandy beaches, but they are especially concentrated inshore, so we do not know if they originate principally from the sea or from land. Citizen science can help answer questions like this one. If many science-conscious citizens dedicate a few

minutes to collecting microplastics and send the information to scientists, the collective effort would add up to build a dataset that would otherwise take years to collect.

Prof. Alan Deidun and Dr Adam Gauci are no strangers to citizen science. You have probably heard of them from the Spot the Jellyfish and Spot the Alien Fish campaigns. Under the ANDROMEDA project, they developed an app that automatically extracts important information from photos of microplastics. At Ghadira and Ramla tal-Mixquqa bays, you can ask beach supervisors to lend you a sampling kit that includes a quadrat and a sieve to filter through sand and take photos. In other places where you can't borrow a sampling kit, you can still use the app by following the instructions on the app itself. By using the app, you will help collect data about microplastics; help train the algorithm behind the app, which has gone through preliminary tests; and remove microplastics from beaches, preventing them from ending up in our food. The same app was showcased and tested with students during a launch event at the Esplora interactive science centre on 16 May, with the same event qualifying as a European Marine Day one.

Ultimately, microplastics have to be stopped at the source by reducing our dependence on plastic. Even if – or when – that happens, microplastics will continue to circulate in our environment for many years to come, so understanding them is essential. **T**

Project ANDROMEDA is funded by the Malta Council for Science and Technology (MCST) through the JPI Oceans Joint Action call: Sources, distribution & impact of microplastics in the marine environment.



Top: Demonstrating how it's done – staff from the Oceanography Malta Research Group (OMRG) demonstrate the application of ANDROMEDA project tools to St Aloysius College students at an outreach event held at the Malta National Aquarium in February 2023



Left: The ANDROMEDA beach microplastic extraction toolkit, to be made available to all ANDROMEDA smart phone app users at Golden Bay and Mellieha Bay this summer

Below: Sand sieving for the extraction of microplastics has become a popular activity on beaches, pursuant to inculcating a greater awareness about plastics in general by demonstrating the high density of microplastics along our coast

Photos courtesy of the Oceanography Malta Research Group

