THE MICROPLASTIC THREAT TO OUR OCEANS

Ana Stanič reports on a women's expedition to assess pollution in the tropical Atlantic

Plastic pollution such as this can severely damage marine environments

Photograph © Alexis Rosenfeld / Science Photo Library

I have always loved the sea, so when Maria Aceo, a London artist who works with plastic, told me about a chance to join a scientific expedition to the mouth of the Amazon to investigate the unseen toxics in our bodies and our oceans, my ears pricked up.

The eXXpedition mission was two-fold: First, to explore the issue of plastics, chemicals, endocrine disrupters and carcinogens that can cause disease in our personal and global environment, and second, to engage women in scientific narratives about the consumer choices we make and their long-term impacts.

More than 8 million tonnes of plastic end up in the sea every year and at least 5.25 trillion pieces of plastic are currently in the oceans. If this rate continues it has been predicted that by 2050 there will be more plastic than fish in our oceans.

Little has been done, though much written, about the plastic that accumulates in the five areas of the oceans where currents converge, known as the five gyres. Even less attention has been given to the study of micro- and nanoplastics in the seas.

Microplastic has a diameter less than 1mm; nanoplastic, less than 100nm. Both are invisible to the naked eye, and little is known about their effect on the health of the oceans.

A key source of microplastic is the tiny microbeads (listed as polyethylene and polypropylene) used in some face and body scrubs, eye shadows, sunscreens and toothpastes. Another source is the acrylic, nylon and polyester fibres we release into water when we do our laundry. According to the Plastics Soup Foundation a fleece jacket of 680g releases almost a million fibres in every wash.

Once in the ocean, micro- and nanoplastic particles are ingested by fish and plankton. According to recent research, there is one microplastic particle in every gram of mussel meat. In the end the microplastic – and the contaminants it carries – ends up on our plates and in our bodies.

High-seas pollution

Our expedition started in Recife, northern Brazil. Our objective was to sample the waters from Brazil to Guyana so that a consortium of Australasian and American universities could study the presence of micro- and nanoplastic and toxins in this part of the Atlantic, and its health in general.

Sadly, eXXpedition had not managed to obtain permits to sample waters in the territorial seas and exclusive economic zones of the countries we sailed through. This meant that we had to limit our sample-taking to the high seas – 200km or more from the shore, and outside the jurisdiction of individual countries.

A combination of weather conditions and lack of permits meant that we were able to take samples of waters for only 10 out of the 18 days at sea, though our leading scientists, Diana Papoulias and Barbara Drigo, assured us that our work would be valuable for their analysis back home. Over the past two decades, Barbara has been studying environmental microbiomes as key indicators of a healthy terrestrial and marine ecosystem.

While much attention is placed on the mammals and fish in our seas, it is the tiny marine microbes that play

a critical role in sustaining life. The marine microbiome is the foundation of the food chain and is a primary respiratory and nutrient-cycling machine for the entire planet. It is incredibly sensitive to environmental stressors such as plastic, yet very little is known about its community dynamics.

We took samples around midday, as microorganisms are most active on the surface of the ocean when the sun is at its hottest. Each of us was assigned to one or more of the 11 experiments conducted each day. We all participated in the manta trawl sampling that was used to collect microplastic and larger particles from the ocean.

We often found fish, plankton and other creatures in the manta trawl. Our finds were carefully analysed by Rachel Bellas, a marine scientist who specialises in sea mammals, and Diana, who is a fish biologist and an aquatic toxicologist, and then stored for further analysis on shore.

A voyage of discovery

We sailed under the skies and stars of the southern and northern hemispheres, saw silver glistening fluorescent plankton at night, dolphins, birds and flying fish. We took turns helming for 4 hours every 8 or so hours. The 24-hour watch schedule was relentless, especially as sleeping was a challenge due to the heat. Each of us in turn took a break every four days from the watch for 24 hours. In return for a 12-hour break, we cooked meals and cleaned the boat for the other 12 hours.

Our voyage of discovery was not all plain sailing. We had our fair share of storms, we started drifting down the river in Recife without a working engine when our anchor's grip loosened, and we got stranded on a sand bank in the middle of the Essequibo River in Guyana.

This expedition challenged me in many ways. But the key lesson I relearned is that the Earth is a paradise, and that we must do more to protect it from our relentless consumption.

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See 5gyres.org for a petition to ban microplastics.

ACTIVISM

WOMEN SHARE TOP GREENPEACE POST

Two women now head Greenpeace International, one of the world's leading environmental-activism organisations. Jennifer Morgan and Bunny McDiarmid will job-share the role of International Executive Director. After a brief interim period, they have succeeded Kumi Naidoo, who retired at the end of 2015.

Morgan was previously global director of the climate programme at the World Resources Institute, and has also worked for the Worldwide Fund for Nature, Climate Action Network, and E3G. McDiarmid, a 30-year Greenpeace activist and ship's crew member, was most recently executive director of Greenpeace New Zealand.

SWEDEN

SAMI PEOPLE HAIL COURT VICTORY

Sami leaders have welcomed a Swedish court ruling that gives the Indigenous people of Girjas, a village in the Arctic Circle, exclusive rights to control hunting and fishing in their district. Åsa Larsson Blind, vice-president of the Sami Council, which represents Sami people in Sweden, Norway, Finland and Russia, said the verdict – reversing a 1993 decision by the Swedish parliament – was "a symbolic step towards getting Sami rights acknowledged".

Around 20,000 Sami are estimated to live in Sweden – which does not register its citizens' ethnicity – with a minority maintaining a traditional reindeer-herding way of life. The Sami language was recognised as an official minority language in 2000.

MOROCCO

SOLAR POWER SETS SAHARA ALIGHT

Morocco has initiated the first phase of a solar power station at Ouarzazate, on the edge of the Sahara desert. Planned to be the world's largest, it will provide electricity for 1.1 million people when it is completed in two years' time. The plant will initially supply 650,000 local people with solar electricity from dawn until three hours after sunset.

The Moroccan government plans to generate 42% of the North African country's energy from renewable power sources – solar, wind and hydropower – by 2020, rising to 52% a decade later.

HONDURAS

WORLD MOURNS MURDERED ACTIVIST

Tributes have been paid around the world to Berta Cáceres, the Honduran Indigenous and environmental rights campaigner, who was shot dead at her home in the town of La Esperanza in March this year. Cáceres, who co-founded the Council of Popular and Indigenous Organizations of Honduras (COPINH), was awarded the Goldman Environmental Prize for her opposition to one of Central America's biggest hydropower projects, the Agua Zarca cascade of four giant dams in the Gualcarque River basin.According to a report by the human rights group Global Witness, 111 environment and social-justice campaigners were killed in Honduras between 2010 and 2014, a higher death toll relative to population than anywhere else in the world.

tinyurl.com/honduras-killings

CLIMATE CHANGE

THREAT TO FRUIT AND VEGETABLES

Climate change could kill more than 500,000 people a year globally by 2050 by reducing the availability of fruit and vegetables – but about the same number of deaths may be prevented if the changes result in a decline in meat eating , according to new research published in the medical journal *The Lancet*.

The research is the first to assess how the impacts of global warming could affect the quality of the diets available to people and found fewer fruit and vegetables would be available as a result of climatic changes.

tinyurl.com/climate-deaths