Saving coral with a toothbrush

Coral reefs are taking a battering. Unspoiled reefs are increasingly rare. Can anything be done about that? Can you restore coral? Yes, you can. Wageningen students and researchers are doing pioneering work off the Kenyan coast.

text Roelof Kleis *photos* Ewout Knoester

The coral reefs off the coast of Kenyan fishing village Shimoni, just north of Tanzania, are gorgeous. The local diving school Pilli Pipa makes a good living out of it. But divers do sometimes come across bits of damaged reef. Patches of rubble, as if a bomb has exploded there.

And that is exactly what has happened, explains Ronald Osinga, coral expert in the new Marine Animal Ecology chair group (see box). 'Those places come about because fishermen use dynamite and nitrate bombs, a well-known method in tropical regions. It is strictly forbidden but there is little control. The anchors of boats cause a lot of damage too.'

That damage can be repaired. Wageningen researchers and students are currently working on a restoration programme. The implementation of this restoration, starting off the coast at Shimoni, is in the hands of a brand-new foundation called REEFolution, the initiative of rose grower Eric Stokman from Oosterbeek in the Netherlands. Until recently he grew his roses in Kenya and regularly went diving with Pilli Pipa, which is run by a Dutchman. Stokman is a member of Heiduikers diving club in Ede, and so is the new professor of Marine Animal Ecology Tinka Murk. And that is how the pieces of the puzzle fit together.

DREAM INTERNSHIP

REEFolution wants to work with local people on restoring and protecting the coral reefs. That is good for the reef, good for the fishermen, good for tourism and therefore also good for the diving school, which is closely involved in the project. Wageningen UR develops and provides the scientific knowledge and expertise which the implementation is based on. REEFolution needs to bring about nothing less than a revolution, says Osinga in explanation of the name. 'In this part of East Africa practically nothing is being done about reef restoration and management. We want to create a support base for that together with the locals.'

Osinga and Murk sent out two students to pave the way for this. They have just got back from four months of pioneering. 'A dream internship,' says Master's student Michelle Marijt. She and Ewout Knoester were tasked with exploring the situation and identifying the options for breeding coral. Specifically this meant designing structures on which you can get coral to grow. Marijt: 'It was a criterion that we should use cheap, locally available materials. Steel cable, PVC tubing, nylon rope and cement.'

Three of their structures have been tested. A floating 'Christmas tree' of PVC, a table and a floating plateau. They cost between 15 and 85 euros. Who says science has to be expensive? For now the Christmas tree seems to come out best. The tree made of PVC tubing hangs upright in the water, pulled upwards by a buoy and anchored to the seabed with a bucket of concrete. Pieces of coral hang from the branches like baubles. The anchor ensures that the light changes with the tide. Light is indispensable for coral. Grown on the plateau, the coral floats at a constant distance from the surface, and on the table it hangs just above the seabed.

TOOTHBRUSH

Because cleaning the structures is essential for growing coral, Marijt and Knoester disappeared underwater for an hour and a half every week at each test site, brandishing a toothbrush. 'I had very little diving experience when I went to Kenya. Now I have made 130 dives of an average of an hour and a half.' And who says cleaning is boring? 'There is always something happening,' says Marijt enthusiastically. 'Suddenly a school of fish comes swimming by. Or an enormous batfish.' She spreads her arms to demonstrate. 'I can get a lot of pleasure out of that.'

In between the cleaning sessions they went through a measuring programme to record the growth, health and grazing habits of fish.

The breeding structures are the nursery of the project. Actually putting the coral out on the reef is the second phase, explains Osinga. 'We still have to make a start on that. One of our ideas for that is a bottle reef – a concrete block with 16 empty wine bottles from the diving school restaurant embedded in it. We stuff bits of the bred coral into the necks of the bottles, which eventually grows all over the glass and the concrete. In ten years' time there will be nothing to show for them anymore.'

Glass and concrete? 'They are inert materials, so you don't pollute the environment with them,' says Osinga in defence of the approach. 'But you are right, they are not natural substrata and it is really just a stopgap measure. But if we had treated our oceans well this wouldn't have been necessary. This approach is being applied all around the world, but we do eventually want to switch to natural materials.'

ESCAPE ROUTE

But there is more to REEFolution's plans than nature conservation. As a researcher Osinga wants to understand what is needed for the development of a fully-fledged reef. 'That has a strong link too with what I do in the lab in Wageningen. The main point of interest is: when does a reef grow and when does it not? We want to know what role fish play in that development. Fish are crucial for the maintenance of coral. We are going to study that this spring using cage experiments in which we keep certain fish out. Another research theme is the creation of new coral. A reef is only really healthy if offspring appear spontaneously through sexual reproduction. I want to know whether and when new larvae appear.'

But Osinga's thinking goes further than renovating damaged reefs. 'My big dream is to make a climate-proof reef,' he reveals. 'A refuge for corals. A great floating reef in the ocean, anchored to the seabed. A reef of that kind at about 15 metres deep, in a well-mixed temperature zone, should absorb the temperature shocks that result from climate change.' A reef as a refuge for threatened coral. A kind of Noah's Ark. 'Depending on the species and the conditions, coral takes 10 to 20 years to grow from nothing to an adult reef,' explains Osinga. 'So I hope to see that.' Ⓡ

Want to know more about REEFolution?

Read previous reports and watch the video on resource-online.nl.

ECO DESIGN

Marine Animal Ecology is the new chair group in which Professor Tinka Murk made a flying start last autumn. Besides Murk, the group includes three members of staff and six (internal) PhD candidates. 'We want to gain an understanding of marine ecosystems and how they adapt to climate change,' is her summary of the research agenda. 'And based on that understanding we want to provide more eco-inspired designs. It's OK to use nature, but you should do so in smart ways so that the ecosystem benefits.' Murk is chair of REEFolution. Her chair group is housed in Zodiac.