ZSL SCIENCE AND CONSERVATION EVENT

Saving coral reefs one species at a time

Tuesday 10 January 2023
6:00pm – 7:30pm UK Time (GMT)

In-person event held at:
Huxley Lecture Theatre, Zoological Society of London, Regent's Park, London NW1 4RY
Tickets are free; registration required: www.zsl.org/SavingCoralReefs

AGENDA

Chaired by Dr Catherine Head, Institute of Zoology and
Rachel Jones, Conservation & Policy, ZSL

Dr Jamie Craggs, Horniman Museum & Gardens
Reflections on a decade of ex situ broadcast coral spawning research, sustainable aquaculture and reef restoration

Dr Fran Cabada, University of Portsmouth &
EDGE of Existence Marine & Freshwater Specialist, ZSL
A pillar story on why we need to look back at coral species to conserve reefs

Dr Bryan Wilson, University of Oxford
The Chagos brain coral (Ctenella chagius): the world's rarest coral

ABSTRACTS

Reflections on a decade of ex situ broadcast coral spawning research, sustainable aquaculture and reef restoration

Dr Jamie Craggs, Horniman Museum & Gardens

Coral reef are the most diverse ocean habitats but are declining globally due to anthropogenic impacts. This has led to many scientists suggesting human intervention through active coral restoration, particularly utilising sexual recruits, is increasingly important if these ecosystems are to survive. However, considerable challenges hamper the effective scale of these efforts, and therefore new research and technical developments are required to provide solutions.

A decade ago a pioneering technique was developed in London to predictably induce broadcast coral spawning events *ex situ*, utilising bespoke aquarium design that accurately replicate the environmental spawning cues (temperature, lunar and diel cycles). The system designs have been modified and improved over time, resulting in 40 Indo-Pacific and Caribbean species being spawned to date.

The capabilities of these systems have provided a novel platform for a diverse range of research into sexual coral reproduction and the development of *ex situ* spawning as a new tool for reef restoration efforts. This talk provides examples of the work untaken during the past decade and introduces the potential of *ex situ* spawning for research, sustainable aquaculture and restoration.

Dr Jamie Craggs is the Principal Aquarium Curator at the Horniman Museum and Gardens in London and co-founder of Coral Spawning Lab. Dr Craggs' main research interest is the reproductive biology of reef-building corals and for the past decade he has been developing techniques to predictably induce broadcast coral spawning events in aquariums. To date he has spawned 40 species and through *in-vitro* fertilisation has produced thousands of genetically diverse coral in captivity. Much of his latest research focuses on the development of pipeline processes that maximise coral production from these reproductive events, to support research, reef restoration and sustainable aquaculture. Having previously worked as an underwater cameraman in Borneo he combines imaging techniques into his research as much as possible. Finally, being a little coral obsessed, three years ago he brought his work home and installed a home coral spawning lab in the family kitchen to teach his two boys about this fascinating world of coral reproductive biology!

A pillar story on why we need to look back at coral species to conserve reefs

Dr Fran Cabada, University of Portsmouth & EDGE of Existence Marine & Freshwater Specialist, ZSL

Our focus on ecosystem-level restoration and monitoring in coral reefs is overshadowing the importance of also focusing on the species that build these wondrous reefs, especially those we rarely encounter. The knowledge gap on the abundance and even the distribution of these rare corals is still hindering effective conservation for these species, but also for coral reefs as a whole. The story of the pillar coral during the past 10 years perfectly exemplifies how species-focused research can drive

effective conservation through prioritisation and targeted interventions. It illustrates how geographical gaps in knowledge can hide strongholds for rare coral species and how these strongholds can be lost without leaving a trace. In 13 years, the pillar coral moved from Vulnerable to Critically Endangered, increasing its risk of extinction. This story should be precautionary; one that drives more interest, funding and action into species-focused research and conservation of reef-building corals. Under the accelerated pace at which the effects of climate change are negatively impacting shallow coral reefs worldwide, the number of threatened coral species is expected to rise, with rare ones and those with limited distribution ranges facing an increased risk of extinction.

Francoise is a marine ecologist passionate about helping to build capacity for the next generation of conservation leaders. Her work focuses on applying multidisciplinary approaches for the conservation of marine biodiversity. Born in Venezuela, Fran has worked in the Southern Caribbean for more than 14 years. She is a member of the IUCN Coral Specialist Group and is part of the management team leading the global RedList update of reef-building corals. Currently, she leads the MSc in Applied Aquatic Biology at the University of Portsmouth and is the Marine and Freshwater Specialist for the EDGE of Existence programme in ZSL.

The Chagos brain coral (Ctenella chagius): the world's rarest coral

Dr Bryan Wilson, University of Oxford

The Chagos Archipelago in the Central Indian Ocean is one of the most remote and relatively pristine reef systems in the world. However, unnaturally warm surface waters in recent decades have devastated corals, and one species in particular, the iconic Chagos brain coral, Ctenella chagius, only found in these islands and until recently thought to be extinct. Using this critically endangered species as a model and bringing together a diverse range of researchers from very different fields, we aim to develop a conservation framework for assessing the threats to rare corals globally. Using some of the most comprehensive high-resolution photographic surveys of reefs in the region to date, and armed with the latest techniques in automated image analysis, we shall attempt to "virtually" find and count these elusive coral species.

The ongoing collection of tissue samples for genetic analyses has helped somewhat to unravel the coral's lifestyle, and will be used to investigate how closely related distant individuals are to each other, and how far their larvae might disperse. Comparing these corals with archive specimens stored in the Natural History Museum and collected a century ago, when the global climate was quite different to that today, may reveal how corals adapt to our changing oceans. Timing our fieldwork around the Full Moon, we will also attempt to harvest larvae from these spawning corals, in a region where corals have never before been seen to reproduce. It is hoped that these larvae will be reared to adulthood in aquaria, potentially one day to restore them back to the reefs of the Indian Ocean. Alongside the biobanking of tissues, this research offers a new opportunity to protect this species from extinction, and should we be successful, we anticipate that other global coral species will benefit from this fundamental work.

Bry Wilson is a coral biologist at the University of Oxford, funded by the Bertarelli Foundation's programme in Marine Science, and studying the impacts of climate change on the world's coral reefs, using a combination of classical ecology, conservation and cutting-edge genomics. His current distractions include charting the rise of a novel and apocalyptic coral-killer in the Caribbean, as well as the health of the remote and relatively pristine reefs of the Chagos Archipelago. His primary obsession, indisputably, is his ongoing quest to save probably the world's rarest coral, *Ctenella chagius*, from the brink of extinction.

ZSL Wild Science Podcast

Catch up on our latest ZSL Wild Science podcast episode: **#037 How can we recover nature in our cities: rewilding, reconnecting habitats and restoring rivers**, featuring ZSL scientists Professor Nathalie Pettorelli, Dr Chris Carbone and Joe Pecorelli. You can find us on a range of apps, including Apple Podcasts, Spotify, or listen on our ZSL Website (www.zsl.org/zsl-wild-science-podcast) and now on our Science and Conservation YouTube channel too! Please remember to **rate, review and subscribe or follow** while you're there to make sure you don't miss any future episodes!

Further Information

- **Recording:** This event will be filmed and published on our Science and Conservation YouTube channel. Please be aware, by attending you consent to being recorded during the Q&A session.
- Please contact scientific.events@zsl.org if you have any queries about our Science events or podcasts.
- **ZSL Library & Archives** will be offering free introductory talks to its special collections from **4:45pm – 5:05pm** before the event; no need to book. Email library@zsl.org if you have any questions.
- For press enquiries, please contact the **ZSL Press Office**: press.office@zsl.org.
- For more information about **ZSL Fellowship** please visit: www.zsl.org/membership/zsl-fellowship.
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