

# Population structure and connectivity patterns of Giant Clams (*Tridacna* spp.) along the Western Indian Ocean

P.A. Kushlani N. Dissanayake\* and Marc Kochzius

Marine Biology, Vrije Universiteit Brussel (VUB), Pleinlaan 2, 1050 Brussels, Belgium

\*[kushlanidissanayake@gmail.com](mailto:kushlanidissanayake@gmail.com)

## Introduction

- ♦ Giant clams (Phylum Mollusca, Family Cardiidae, Sub family Tridacninae) are the largest living bivalves and are dwelling in coral reefs.
- ♦ They play a key role in the ecosystem as a primary producer and as an ecosystem engineer (Cabaitan *et al.*, 2008; Neo *et al.* 2015).
- ♦ The populations are extensively harvested for food, aquarium and curio trade worldwide (Heslinga and Fitt, 1987; Wabnitz, 2003).
- ♦ Giant clams are declared as threatened species by the International Union for Conservation of Nature (IUCN) and protected under Appendix II of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- ♦ However, stock decline and local extinction of the species are evident in many regions due to overexploitation, habitat degradation, pollution and climate change (bin Othman *et al.*, 2010; Soo and Todd, 2014).
- ♦ Therefore, knowledge on their population structure, genetic diversity and connectivity is requisite to make sound management decisions, which are lacking in Western Indian Ocean (WIO) and Red Sea.

## Methodology

### Sample Collection

- ♦ Studied species: *Tridacna costata*, *Tridacna maxima* and *Tridacna squamosa*.
- ♦ Study sites: Red Sea (Jordan, Egypt, Saudi Arabia) and WIO (Kenya, Tanzania, Mozambique and Madagascar).
- ♦ Small pieces of mantle tissue were collected while SCUBA diving without harming the animal and preserved in 96 % ethanol.

### DNA Sequencing

- ♦ Genomic DNA was extracted using Chelex method.
- ♦ A fragment of the mitochondrial cytochrome oxidase I (COI) gene was amplified by PCR and sequenced.

### Data Analysis

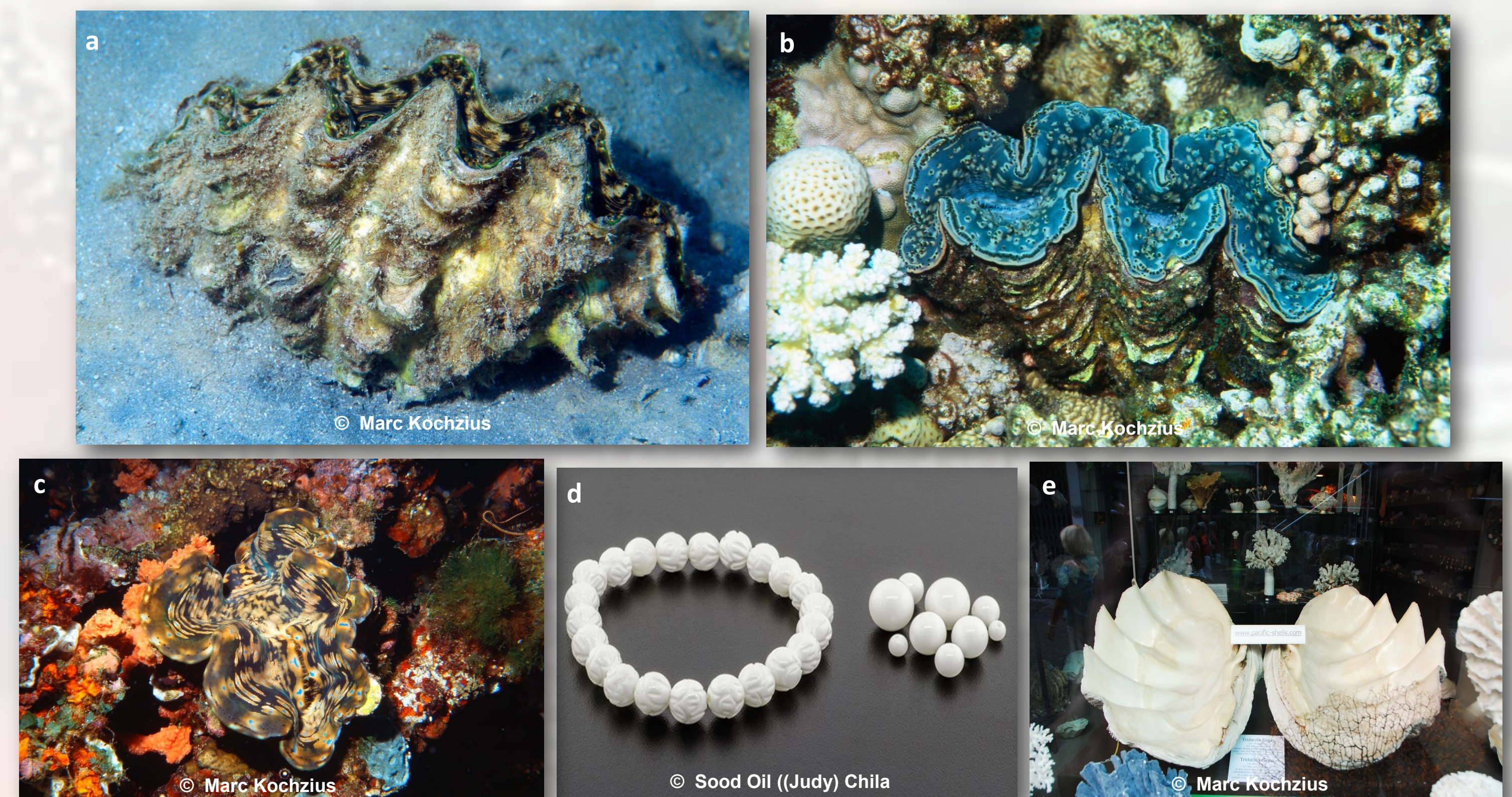
- ♦ Species identification will be conducted by using the DNA barcoding database BOLD ([www.boldsystems.org/](http://www.boldsystems.org/)) and phylogenetic analysis.
- ♦ Analysis of molecular variances (AMOVA) to detect the genetic population structure, and haplotype diversity and nucleotide diversity will be calculated by using the program Arlequin.
- ♦ Obtained sequences will be compared with those from previous studies in order to investigate large-scale connectivity and evolutionary processes.

## On-going research tasks

- ♦ Comprehensive analysis of data
- ♦ Application of statistics
- ♦ Comparison of obtained data and information with published data from the Indo-Pacific region

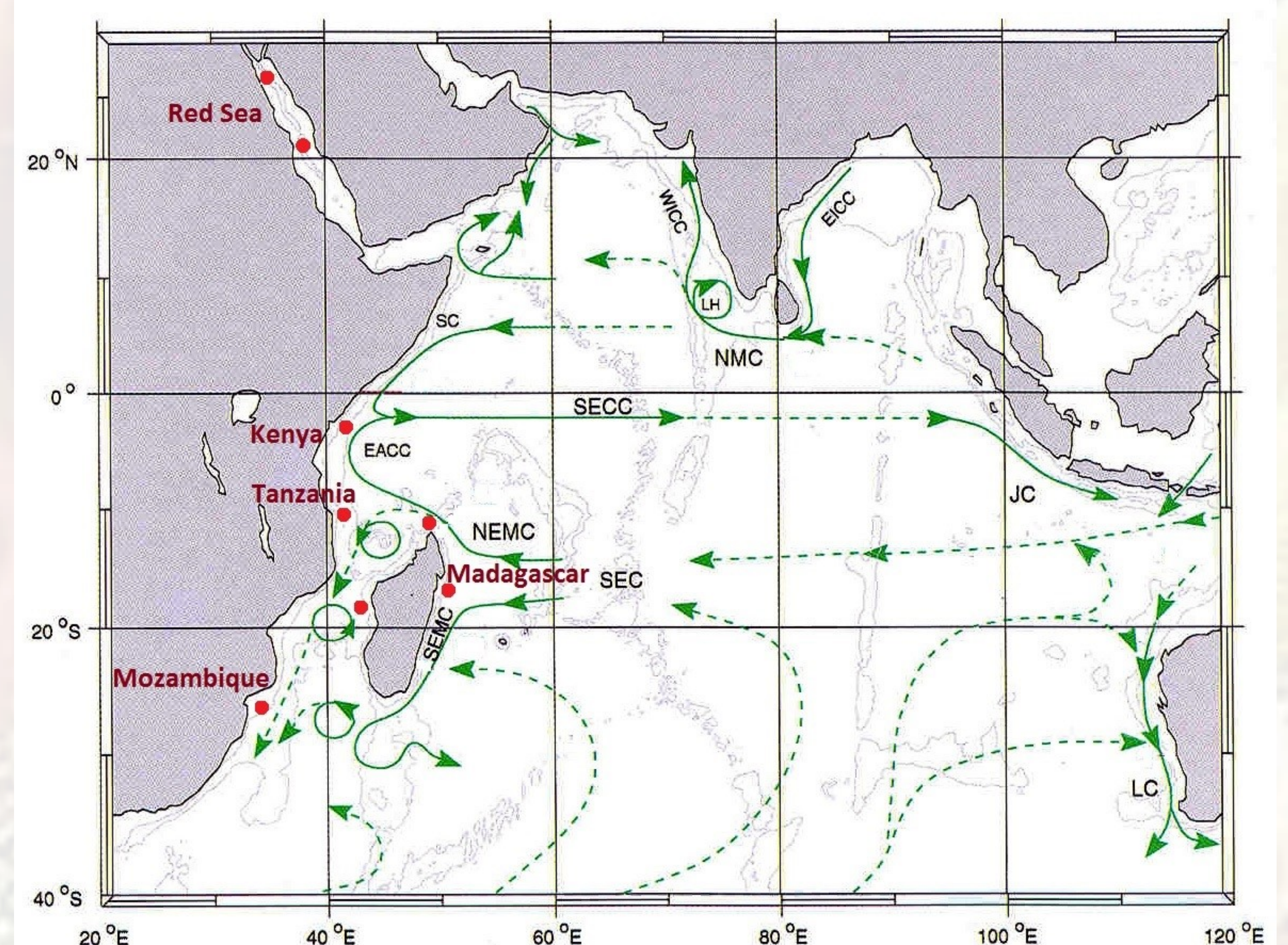
## Objectives

- ♦ To elucidate the genetic population structure and genetic diversity of *Tridacna* spp. in the Red Sea and WIO.
- ♦ To estimate connectivity among tridacnid populations.
- ♦ To provide information that is required for establishing transboundary management units for the conservation of giant clam populations.



Figures: <sup>a</sup> *T. costata* <sup>b</sup> *T. maxima* <sup>c</sup> *T. squamosa*. Giant clams' meat is a popular food in Southeast Asia. They are listed in most traded top ten marine invertebrate catalogue. <sup>d,e</sup> Their shells are renowned as "White gold of the ocean", widely using in curio trade and jewellery making.

## Study area



## References

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