Multi-disciplinary approaches for coral reef management in Eparses islands (SW Indian Ocean)


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• Demographic growth => degradation of coral reefs
  Human perturbation makes coral reefs more susceptible to global change

• Areas with low human impact are rare ⇔ study the impact of climate change / Eparses Islands

• They should be classified as MPAs to reinforce their protection
  But knowledge of coral reefs is very low

  (Biodiversity, Resources and Conservation of coral reefs at Eparses Is.)

1) Complete inventories associated with DB and base GIS
2) Establish a baseline study of fish communities
3) Look for potential indicators of disturbance for optimised monitoring over the long-term
Study area

Eparses Islands
(Emerged land / coral reef surface)

SW Indian Ocean

Juan de Nova
5 km² / 212 km²

Glorieuses
9 km² / 201 km²

Bassas da India
0 / 96 km²

Tromelin
2 km² / 7 km²

April 2011

Nov. 2011
Remote sensing

Underwater Visual Census

Standardized methodology consistent with GCRMN method at highest taxonomy level

- **BENTHOS** transect LIT (20 m) x 3 – benthic categories & coral species
- **FISH** belt transect (50 x 5 m) x 3 – species, abundance & size
- **Resilience analysis** belt transects (20 x 1 m) – coral sizes and site resilience indicators (coral communities, management regime, turbidity,..)
- **Biodiversity inventory** - Random path 50 min
- **Habitat classification mapping**

GCRMN Station

UVC - Reef flat and slope (10-15 m)
45 stations

Materials & Methods

Context & Objectives

Results & Discussion

Conclusion
Gradient along the Mozambic channel

Coral cover Glorieuses - → + Europa
Algae cover Glorieuses + → - Europa

Differences could be due to their geomorphology, isolation and thermal stress
Good recovery at Juan de Nova (2004-2011)
SR theoretical (Allen & Werner, 2002) ↔ Coral Fish Diversity Index (CFDI)
Chaetodontidae, Pomacanthidae, Pomacentridae, Labridae, Acanthuridae and Scaridae

Coral communities

Specific communities for each island with “crossing over” for Europa/Bassas

- Europa: Montipora / Porites spp, Bassas: mixed hard / soft corals, Juan de Nova: Pocilloporidae & mixed algal (CA /AA), Glorieuses: algal assemblages dominated by Halimeda spp,
- Tromelin: Faviidae (Favia, Favites spp)

Good recovery from 1998 bleaching events

Fish communities

- Density dominated by plancton. > 59%
- Biomass dominated by piscivores > 77%
- RS dominated by carnivores > 57% (11% Piscivores)

High biomass 195 g/m² (> 950 g/m²) except for Glorieuses 84 g/m² ⇐ illegal fishing?

Presence of large piscivores / herbivores and low fleshy algae ⇐ health of coral reefs
Biodiversity

Inventory in progress (some sp new for Europa, not for science)
(algae, cnidarians, crustaceans, echinoderms, fish)

FOCUS EUROPA

Scleractinian corals

Hydroids

Echinoderms

Algae

Crustaceans

Fish

128 sp

77 sp

37 sp (36 new)

134 sp (all new, 10% N)

175 sp (61 new)

390 sp (92 new)
**Results & Discussion**

- **High coral cover**
- **Low fleshy algae cover / high coralline algae**
- **Clear spatial pattern between North /South**
- **High fish and coral species richness**
Identify priority conservation areas for managers.
Marion Dufresnes expedition
✓ get synoptic measurements on all islands (GCRMN in SW Indian Ocean)
✓ establish baseline of benthic and fish communities of Eparses Islands

Europa
✗ biodiversity inventories /DB (algae, cnidarians, crustaceans, echinoderms, fish)
✗ marine habitat mapping (geomorpho, communities, pressures, …)

Identify priority areas for conservation and management
Next steps Glorieuses (2012) et Juan de Nova (2013)
Thank you for your attention!

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