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EDGE
EVOLUTIONARILLY DISTINCT & GLOBALLY ENDANGERED

Survival Blueprint

Blister Coral, *Horastrea indica*

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1. STATUS REVIEW

1.1 Taxonomy:

Cnidaria →Anthozoa →Scleractinea →Siderastreidae →Horastrea

Species: *Horastrea indica* (Pichon, 1971)
Common name in English: Blister coral, Horastrea coral
Common name in Malagasy: Hara kanty

1.2 Distribution and population status:

1.2.1 Global distribution:

This species is found in the southwest Indian Ocean and along the East African coast and Madagascar, commonly on sandy reefs shallow areas up to 20 m depth.

Country	Population estimate (plus references)	Distribution	Population trend (plus references)	Notes
Madagascar	18 localities in the south west of the country and 9 areas in the north of Madagascar.	18 populations identified in the south west region but nine other occurrences of the species were recorded in the north and Toliara region	Population studies of *Horastrea indica* are limited to reports of presence in the north west, north east, and south west of Madagascar. At the regional level, it is also reported to be present in the Mascarenes ocean (Faure, 1977; Pichon, 1973; Harding, 2004; Obura, 2012; Veron, 2003, 2004; McKenna *et al*., 2005)	
Kenya, Seychelles, Comoros, Mozambique, Tanzania, South Africa	Distribution boundaries	Occurrences of the species are recorded in these different countries	Veron, 2004; Sheppard *et al*.,2008; EDGE Coral Reefs Workshop, 2010.	

1.2.2 Local distribution:

Country	Region / province	Site	Level of Protection	Population size	Reference(s)	Notes
Madagascar	South west	Velondriake (18 populations identified)	In progress	222.36 individuals per hectare (Radonirina L. Blue Ventures, 2014 not published)	Harding, 2004	
Madagascar	South west	Great barrier reef of Toliara	None	Unknown	Pichon, 1978, 1973	Present
Madagascar	North west	Nosy Be to Nosy Hara	Protected area	Unknown	McKenna et al. 2005, RAP31	Present
Madagascar	North east	Ambodivahibe, Loky Bay, Ankao	Protected area	Unknown	Obura, 2011	Present

1.3 Protection status:

Horastrea indica is a scleractinian coral, which is mono-specific and listed as Vulnerable in the IUCN Red List of threatened species under criterion A4c since 2012. This species is likely to face population reduction due to the common threats it shares with other reef building corals such as bleaching and habitat degradation. Therefore, an estimated habitat degradation and/or loss of 45% over three generations (30 years) is the best inference of population reduction and meets the threshold for Vulnerable under Criterion A4 ce (Sheppard, C., Turak, E. & Wood, E., 2008). *H. indica* is also listed in Appendix II of CITES, protecting the species against trading and exploitation. The species is also described as 'evolutionary distinctive' with a score of 16.04. Studies about the biology and ecology of the species are imperative to understand its conditions for living and it's resilience to stressors.

1.4 Ecology, behaviour and habitat requirements:

The biology of the species, including its reproductive and growth strategies, is yet to be documented. Morphologically, based on Veron's description in 2000, *Horastrea indica* is a massive colony that is small in size. Polyps are pale-brown with a pale gray-blue oral disk. Coralites are separated and distinctive, and raised several millimetres above the coral's surface (phacelo-meandroid). Coralites are rounded or regular and are 8-10 mm in diameter. Valleys may reach 4 cm in length. Septa are numerous (as many as 80 arranged in 5 cycles) clearly visible and closely packed. Septa may be perforated with compound teeth. Columella is distinct and papillose in appearance. Colonies are constituted by coralites mainly monocentric and plocoïdes but could be pluricentrics (dicentric even tricentriques). Coralites have numerous septa from 50 to 90 (Faure, 1982).

An ongoing study concerning the population status of the species in south west Madagascar (Blue ventures, 2014) has shown that the species is generally small, with colony diameter ranging from 2 to 4 cm. Colonies of a larger size have been observed, however these are rare. The lack of current knowledge surrounding the species' reproduction and growth renders estimating relationships between the size and life history strategies challenging at present.

Horastrea indica occurs in shallow, tropical reef environments, generally to depths of 20 m, in sandy reef areas (Sheppard *et al*., 2008). In the south west of Madagascar, colonies can be found at depths between 4 and 20 metres. They are most abundant between depths of 10-20 metres. Faure (1982) mentioned that this species occurs in the outer reef; a study conducted in the LMMA of Velondriaka affirms it. Fringing reefs contain fewer colonies because this reef type is closer to the shoreline, where sediment accumulation from land is higher. The size of colonies across sediment types does not seem to change. Coarse and fine sand habitats do not generally support colonies of the coral. Faure in 1977 affirms that the species is an indicator of sediment deposit along with *Coscinarea monile* and *Parascolymia*.

1.5 Threat analysis:

Horatrea indica is not escaping from the scleractinian coral threats.

- Climate change and the increase of sea surface temperatures cause stress to the zooxanthellae living in symbiosis in the polyps; the intensity of this stress causes these microscopic algae to be expelled which is the main source of energy for the polyps. Coral affected by this phenomenon loses its colour.
- Sediment run-off is also common in the WIO region. An excessive accumulation of sediment on a reef habitat overwhelms the coral and can slow its growth and reproduction.
- Overfishing, one of the most important threats in WIO region, slows or even stops the resilience capability of the reef system and this species.
- Coral species trading is not yet very important in Madagascar, however it's a parameter that shouldn't be neglected. The presence of protected areas is the best conservation practice that this species has to date.
- Tourism is also a potential threat for Horastrea coral. Irresponsible divers and boat moorings can damage the colonies.
- The species is unknown by the local population but also by the scientists.
- Cyclones are very frequent in the WIO region; this could damage the habitat where colonies are abundant. Presence of *Acanthaster planci* (Crown-of-thorns starfish) was not frequent in the south west of Madagascar, however, this parameter shouldn't be neglected.

Most of the population identified are within a protected area. The presence of rules in those localities already constitutes protection for the species. However, change in human activities from agriculture to fisheries due to the population growth, increases the use of the reef and the shift of targeted species. Land use is also the main factor increasing sediment run-off into the reef ecosystem, land use management, mining activities, agriculture from the highlands, river system management and pollution will impede the species to withstand stresses and stay healthy. Promoting the species for tourism activities has both negative and positive impacts on the Horastrea

population, as it could extend the risks of trading. It's imperative that studies in the region focus on reproduction, growth and population genetic. Comprehensive knowledge about this species is a valuable tool for conservationists to implement management strategies.

1.6 Stakeholder analysis:

Country	**Stakeholder**	**Stakeholder's interest in the species' conservation**	**Current activities**	**Impact** *(positive, negative or both)*	**Intensity of impact** *(low, medium, high or critical)*
International	EDGE of Existence	Conservation and research	Funders	+	High
International NGO	CORDIO	Conservation and research	Partner	+	Medium
International NGO	Blue Ventures	Marine conservation and research	Practitioners	+	High
Madagascar	Centre National pour les Recherches Océanographiques (CNRO)	Research (Rapid assessment Program in North Madagascar)	Research organisation	+	High
International NGO	Conservation International	Marine conservation and research	Promote marine conservationn	+	Medium
Madagascar	Institute Halieutique et des sciences marines	Research and education	Partner University and research centre	+	High
Madagascar	Madagascar National Parks	Marine and terrestrial conservation	Partner.	+	High
Madagascar	Velondriake, Fimimano	Local ressource management, Law enforcement		+	High

1.7 Context and background information that will affect the success of any conservation action for this species:

	Description	Barriers to conservation	Opportunities for conservation
Socio-cultural effects and cultural attitudes	Coral reefs support vast coastal human populations, many of whom depend upon these ecosystems for survival. Traditions and cultures of the Vezo people (one of the main fishing tribes in the country) are directly linked to the sea. A high level of migration from highland areas to the coast is also increasing population pressure on reef resources.	Human pressures comprise a significant threat to the habitats of *Horastrea indica*. Beach seining and poison fishing are still practiced to a degree in the region. Other fishing activities that affect the functional group dynamics of the ecosystem are also of concern.	

Economic implications	Tourism, mining and agriculture are sectors that are starting to expand in the country.	Reefs located off continental Africa and Madagascar are continually damaged by sediment runoff, nutrient pollution and over-exploitation of reef resources (Wilkinson, 2000). Tourism also creates habitat damage through boat anchors and irresponsible diving. The economic value of the species would increase the risks of trading in the future.	Use the presence of *H. indica* to re-launch tourism activities in the region. Protection of an endemic species could also benefit other species of reef building corals. A resulting healthy reef will be positive for the other associated organisms and will impact in fish abundance. Creation of a well-defined protection strategy for the species will minimize the potential effects from physical threats of tourism.
Existing conservation measures	Convention of the International Trade in Endangered Species of Wild Fauna and Flora (CITES) and existence and use of the local law ('Dina') and agreements made between the local community to manage protected areas.	Law and conventions are not well understood. Lack of enforcement on the ground.	National distribution of the species needs to be assessed. Tools to measure the efficiency of MPA. Need more information on the resilience of the species and its response to stress.

Administrative/political set-up	Madagascar has a vision to triple its Marine Protected Area coverage (Durban vision in 2002, World Parks Congress, 2014)	Dependance of external funding & expertise on the species. Lack of data available to monitor the species.	Durban Vision: increasing the number of MPAs throughout Madagascar. The World Parks congress 2014: committed to tripling MPAs in the country.
Local expertise and interest	Rapid Assessment Programs' surveys and EDGE Madagascar, EDGE fellow conducted research and conservation of *Horastreaindica.*	Lack of Funding. Study only done on a regional scale not national or international.	Collaboration with different national institutions to better understand the species
Appeal of species	*H. indica* is small and a beautiful animal.	This coral species is traditionally unknown in the region. This could lead to more consideration of the species and its habitat.	Sustainable tourism activities can be a solution to launch conservation of the species by showing the monetary value of the species to local stakeholders. *Horastrea indica* is a beautiful species, and very attractive due to its small shape and its colour. The community doesn't impact directly to the species (e.g. turtle is part of their traditional food).

2. ACTION PROGRAMME

Vision (30-50 years)	
Horastrea indica identified are protected and well known in terms of biology, ecology and threats	
Goal(s) (5-10 years)	
Long term monitoring of *H.indica* in all Madagascar MPAs - National distribution of *H.indica*	
Objectives	**Prioritisation** *(low, medium, high or critical)*
1- Population status of the species in the north , east and south region assessed	Critical
2- Inclusion of the species into the management strategy of each protected area and conservation plan	High
3- Developing international and national cooperation between scientific and expert organizations working on research and conservation of coral reefs in the WIO	Medium

Activities	Country / region	Priority *(low, medium, high or critical)*	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
Objective 1: Objective title Long term monitoring of the species							
Monitoring population of *H.indica*	NE Madagascar	Critical	2015	Government agencies, NGOs	Developed programme that is used regularly during monitoring	Capacity building for rangers and field scientists and data sharing - useful for management Logistics: might not be accessible	Improving knowledge
Develop a mitigation plan for each site	Madagascar	Medium	Every year 2016-2025	Government agencies, NGOs	Inclusionof the species into conservation plan	Illegal fishing activities	Management
Develop standardized field techniques for surveys and monitoring	Madagascar	Critical	2015	Government agencies, NGOs	Methodology established	Ability to compare data collected with the same method	Improving knowledge
Training for surveyors	Madagascar	Critical	2015	CNRO, MNP, WWF, CI, BV, IHSM, Reef Doctor	Train personnel.	Finding a qualified surveyor	Capacity building

Activities	Country / region	Priority *(low, medium, high or critical)*	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
Establish long-term monitoring programmes in key sites	Madagascar		2016	CNRO, MNP, WWF, CI, BV, IHSM, Reef Doctor	Methods & data collection in place at each site	Identification of long term key sites with baseline data	Species management
Objective 2: **Inclusion of the species into the management strategy of each protected area and conservation plan**							
Educate local communities, government agencies, NGOs and economic operators of the importance of *H. indica*	Madagascar	Critical	2015	Government agencies	Workshops held for all participants	Disinterest	Education & awareness
Engage community, media, decision makers, and the private sector in the management.			From 2016	Government agencies	Workshops held for all participants	Disinterest	Management

Activities	Country / region	Priority *(low, medium, high or critical)*	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
Law enforcement for each of its habitats and ecosystems				Government agencies Community manager	Monitor illegal activities in the reserves, numbers of law transgression occurrences	Absence of such system	Management
Objective 3: **Developing international and national cooperation between scientific and expert organizations working on research and conservation of coral reefs in the WIO**							
Published paper	International	Critical	2015	National and International Organisation	Paper published		Education and awareness
Conferences and workshops	International	Critical	2015	National and International Organisation	Attendance and presentation of report	Lack of funding and workshops about coral reefs are less frequent in the country and in the eco-region WIO	Education & awareness

Activities	**Country / region**	**Priority** *(low, medium, high or critical)*	**Time scale**	**Responsible stakeholders**	**Indicators**	**Risks**	**Activity type**
Adoption of research methods that will permit comparisons of results between countries	International	Critical		2016	International organisation, governmental organisation	Methods developed and monitoring started	Understanding of the distribution patterns of the species around the region of WIO Laboratory availability in other regions in case it's not available in country. Experience sharing with international experts Disinterest

3. LITERATURE CITED

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