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Connectivity of the coral *Acropora tenuis* in Spermonde Archipelago

INTRODUCTION

• **Coral reefs** have the highest species biodiversity of all marine ecosystems.
However, since they are declining globally due to anthropogenic impacts, conservation is essential.
• **Marine Protected Areas (MPA)** are an important conservation tool.
MPA's should be arranged in networks, because coral reefs are scattered/patchy habitats.
This ensures connectivity and increases resilience.

Hermatypic corals are ecosystem engineers that build the three-dimensional structure of the reef.
Insights of population dynamics help to develop management strategies for conservation.

Exploring the Indonesian region in Sulawesi, study of a hermatypic, mass-spawning coral: *Acropora tenuis* in Spermonde Archipelago.

Fig 1: Adult colonies of *Acropora tenuis*. (Picture: Puspita Sutrisno, 2013)

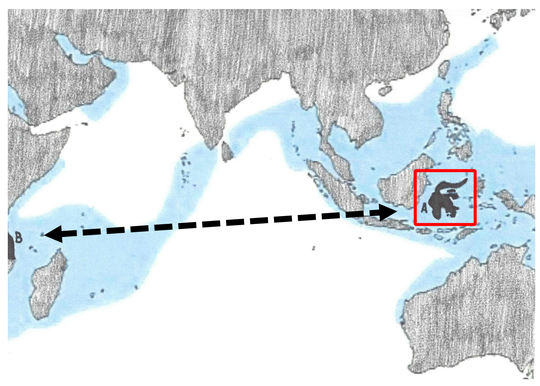

Fig 2: Distribution map of *Acropora tenuis*. (A) the Spermonde archipelago, Sulawesi, ID (B) the coast of Tanzania. (Veron, 2000)

Research objectives

A. population structure on a local scale:
What is the composition of genetic diversity?
(allelic richness + heterozygosity)
Hypothesis: Genetic diversity is shaped by local sea surface currents.

B. gene flow and connectivity on a global scale:
Is there migration and/or dispersal across the Indian Ocean?
(F-statistics + Mantel test + AMOVA + Bayesian cluster analysis)
Hypothesis: There are two distinct genotype clusters: an African and an Indonesian cluster.

SAMPLING

Code	Sites in Spermonde	#
BL	Barang Lompo	4
BT	Bone Tambung	3
SL	Sarapo Lompo	5
LA	Lanyukang	8
BA	Badi	24
KL	Kodingareng Lompo	15
KK	Kodingareng Keke	17
KA	Kapoposang	4
	Sample Total	**80**

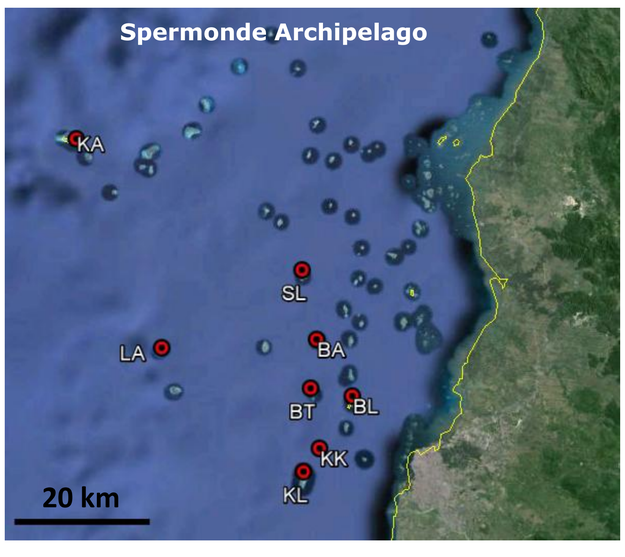

Fig 3: Samples collected in Spermonde, SE-Sulawesi.
TOP RIGHT– Table of sampling sites: site code, site name and number of samples collected there.
DOWN– Spatial distribution of the collection sites.

MATERIAL & METHODS

Acropora tenuis coral branch: 80 samples from 8 locations.
• Genomic DNA extraction and purification
• Microsatellite analysis (SSR length polymorphism)
1. 7 markers from (Underwood *et al*., 2009) + 9 markers from literature search (NEW)
2. Primer validation + Multiplex PCR with fluorescent labeled primers
• DNA capillary sequencer
1. Fragment Length Analysis of PCR products
2. Scoring of fragment lengths

Genotypes = length polymorphisms of microsatellites
• Statistical analysis of the length polymorphism
Fstat (F-statistics), GenAlEx (AMOVA + Mantel test), STRUCTURE (Bayesian cluster analysis):
• Data comparison with samples from the Tanzanian coast
Dataset from a previous study (Rosa van der Ven, 2012)
Measure of gene flow and connectivity

RESULTS

• Successful primer validation + Multiplex PCR for the 7 markers (Underwood *et al*., 2009)
Successful fragment length analysis → scoring process ongoing.
• Primer validation for the 9 NEW markers ongoing.

References:
• Underwood J N, Smith H L D, Van Oppen M J H, Gilmour J P (2009) Ecologically relevant dispersal of corals on isolated reefs: implications for managing resilience. Ecological Applications 19(1):18–29.
• Veron, J (2000). Corals of the world. Australian Institute of marine science. p360-361 and Veron, J (2013). Internet, (http://coral.aims.gov.au/).
• The map of South-Sulawesi (http://en.wikipedia.org/wiki/File:Sulawesi_blank_map.png) is under the terms of the GNU Free Documentation License (last accessed: 28 February 2014).
• The map of the Spermonde Archipelago was taken with Google earth V 7.1.2. Spermonde Archipelago, Sulawesi, ID. 4°55'11.51"S, 119°13'19.93"O, Eye alt 121.28km [image:2013-04-10]. (accessed: 2014-02-26).