



has the honour to invite you to the public defence of
the Joint PhD thesis of

Dennis DE RYCK

to obtain the degree of Doctor of Sciences

Joint PhD with Université Libre de Bruxelles

Title of the PhD thesis:

Propagules and patterns:

*the population genetic structure of mangroves in the Western Indian
Ocean as a result of dispersal and its constraints*

Promotors:

Prof. dr. Ludwig Triest

Prof. dr. Nico Koedam

Prof. dr. Farid Dahdouh-Guebas

The defence will take place on

Monday September 4 2017 at 17.00h

in Auditorium D.2.01 at the Campus Humanities,
Sciences and Engineering of the Vrije Universiteit
Brussel, Pleinlaan 2 - 1050 Elsene, and will be
followed by a reception.

Members of the jury:

Prof. Dr. Marc Kochzius (chairman)

Prof. Dr. Olivier Hardy (secretary, ULB)

Prof. Dr. Kim Roelants

Prof. Dr. Jean-François Flot

Dr. Thorsten Balke (Glasgow, UK)

Dr. Ivania Cerón-Souza (The Colombian Corp. for
Agricultural Research, Colombia)

Curriculum vitae

Dennis De Ryck (Brussels, 1985) graduated from the Master of Science in Biology program in 2009. In 2010 he started a position of teaching assistant at the department of Biology (VUB) and a joint-PhD (VUB-ULB). During his PhD he gave courses on *i.a.* ecology, fieldwork and conservation genetics. Dennis did field excursions to South Africa, Kenya and Mozambique and stayed at the Royal Netherlands Institute for Sea Research. Dennis published eight articles in international peer-reviewed journals (of which three as first author) and presented his work at three international conferences.

Abstract of the PhD research

The intertidal mangrove forests with its emblematic stilted trees are declining worldwide mainly as a result of coastal development, aquaculture expansion and over-harvesting resulting in increased fragmentation. Knowledge about the dispersal abilities of the mangrove propagules is therefore crucial in understanding the regeneration process of these forest, interpret genetic patterns and to draw up suitable conservation plans.

In my thesis, I have looked at the process of dispersal, its resulting patterns and the consequences or effects on the genetic population structure in mangroves.

The dispersal process was investigated through extensive *in situ* release-recapture and *ex situ* flume (water racetrack) experiments with a diverse array of mangrove propagules (seeds, fruits and seedlings). Herewith, insight was provided into the differential influence of environmental and biological drivers on propagule dispersal as well as species-specific propagule characteristics on the dispersal potential for a range of common mangrove species.

The resulting patterns of dispersal were investigated by sampling genetic material of *Avicennia marina*, in the Western Indian Ocean (WIO). *A. marina* is a pioneer species and often a dominant constituent of the mangrove forest. I showed *A. marina* has lower allelic, genetic and genotypic diversity than other regions within its range. Within the WIO, I observed a complex genetic structure linked to ocean currents, range edge effects, genetic isolation/connectivity and mating system.

I finish with a discussion on the potential origin of the strongly divergent genetic signal were observed on both cpDNA and nDNA level in *A. marina* from the Seychelles and East Madagascar. Three possible hypotheses to explain the occurrence of this diverged *A. marina* were constructed based on the possible occurrence of biparental chloroplast inheritance (BPI) and nuclear copies of plastid DNA (NUPTs).