

The Research Group
Ecology and Biodiversity

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

Nathalie TONNÉ

to obtain the degree of Doctor of Sciences

Title of the PhD thesis:

**TO MOVE OR TO STAY PUT:
Rhizophoraceae mangrove species autoecology
in the early life stages of the viviparous seedlings**

Promotor:

Prof. Dr. Nico Koedam

The defence will take place on

March 29th 2017 at 17:30 h

in Auditorium D.0.05 at the Campus Etterbeek of the Vrije Universiteit Brussel, Pleinlaan 2 - 1050 Elsene, and will be followed by a reception.

Members of the jury

Prof. Dr. Ludwig TRIEST (VUB, chairman)
Prof. Dr. Geert ANGENON (VUB, secretary)
Dr. Ir. Hans BEECKMAN (KMMA, co-promotor)
Prof. Dr. Dominique MAES (VUB)
Prof. Dr. Johan DE MEY (UZ Brussel, VUB)
Dr. Frederic LENS (Leiden Univ.)
Dr. Mwita M MANGORA (Institute of Marine Sciences, Univ. of Dar es Salaam)

Curriculum vitae

Nathalie Tonné (born in Aalst, Belgium, 1989) graduated as a master of Science in Biology at the Vrije Universiteit Brussel.

In October 2012, she started her PhD under the supervision of Prof. Dr. N Koedam at the APNA laboratory (Vrije Universiteit Brussel) and Dr. Ir. H Beeckman (Royal Museum for Central Africa), with a scholarship from Research Foundation Flanders (FWO).

She has (co)-authored 3 peer-reviewed papers, and is the first author of 3 peer-reviewed papers.

Her work was presented at several international conferences (among others VLIZ 2015 – Bruges, Belgium; WSUFEM 2015 – Tervuren, Belgium; GTÖ 2017 – Brussels, Belgium), as well as through several posters (WSE 2013 – Naples, Italy; WSUFEM 2015 – Tervuren, Belgium).

Abstract of the PhD research

Mangroves are tropical and subtropical intertidal forests: trees colonising seashores and partially submerged at high tide. These forests provide many ecosystem services, from coastal protection and carbon sequestration to goods for direct use. Though still wide ranging and common, their decline is rapid and ongoing in many countries worldwide. Conversion and coastal development is insufficiently countered by regeneration and mangrove planting, which very often has poor success rates.

The intertidal mangrove biotope is a physiologically and physically highly dynamic and demanding environment. Mangrove seedlings are particularly challenged to withstand physicochemical conditions which are very unusual for the tree life form.

Mangrove species from the family Rhizophoraceae are viviparous: a unique feature of seeds germinating without a dormancy period while attached to the parent tree. The resulting mangrove seedlings elongate and form large, cylinder-shaped structures. Upon maturity, the seedlings abruptly detach and, depending on the tidal cycle, can plant underneath the tree or embark on dispersal, which is transoceanic in exceptional cases.

The seedling is a direct source to mangrove forest rejuvenation or range expansion. Yet, little is known about seedling anatomy, functioning and physiology during their earliest life stages, even though these stages determine the survival and potential of the seedlings to become young trees. In this work, I investigated the structure and functioning of the elongated seedling structure of the Rhizophoraceae mangroves during three consecutive early seedling life stages: (1) on-tree development, (2) water borne dispersal, and (3) establishment and growth by *in situ* and *ex situ* observations and through histochemistry, CT-scan and microCT-scan approaches.

I aimed to (i) contribute to a holistic understanding regarding the ecological adaptation of viviparous rhizophorean mangrove seedlings to the dynamic intertidal area, (ii) to expand fundamental knowledge on mangrove autoecology, and (iii) better understand the significance of the trait 'vivipary' in the tribe Rhizophoreae and hence to shed light on the multiple functions in one highly adapted biological structure.