Growth and structural changes of viviparous mangrove propagules: The effect of environment on dispersal and establishment

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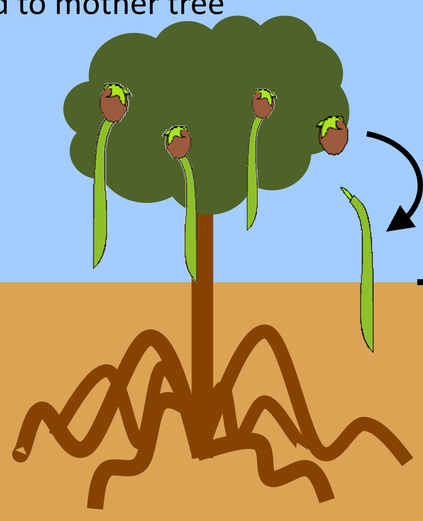
Introduction

Life cylce of viviparous mangrove trees

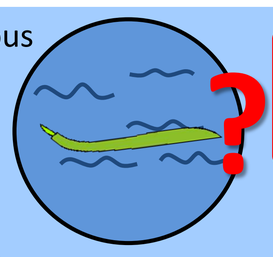
Seeds **germinate** while still attached to mother tree

Seedlings grow on mother tree



Abscission

Hydrochorous dispersal

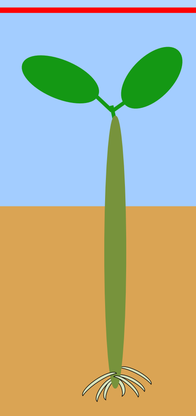


What happens during dispersal?
Do propagules go through a dormancy period?

Stranding, root growth and self-erection

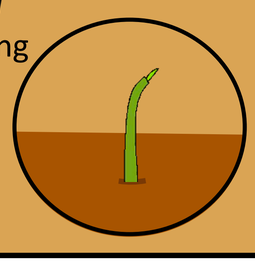
Establishment

Root growth



Sea
Land

Self-planting

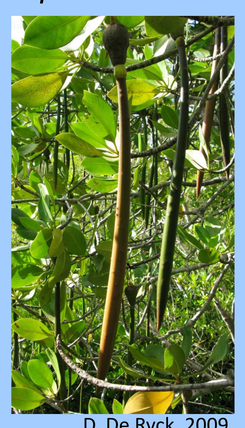


What triggers root growth and establishment?

Material and methods

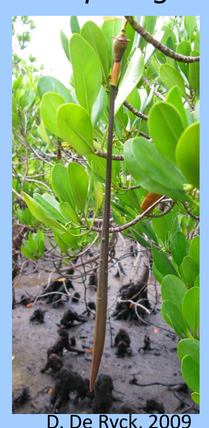
Studied species:

Rhizophora mucronata



D. De Ryck, 2009

Ceriops tagal



D. De Ryck, 2009

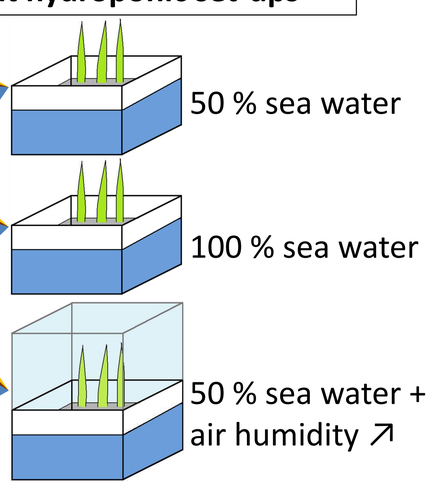
Mature propagules were collected on a landward and a seaward site in Gazi Bay, Kenya, East-Africa

Simulation of the period between abscission and establishment on different substrates

Propagules are left on one of the three substrates for different periods of time.

Every 6 days, three propagules are taken from each substrate...

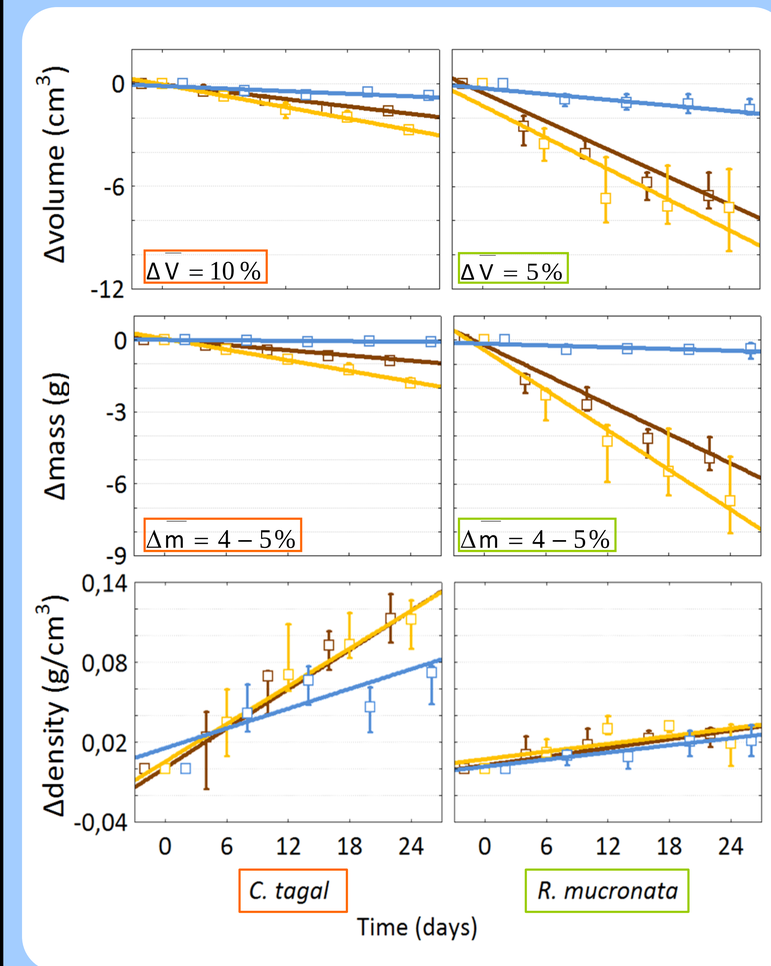
Simulation of establishment in different hydroponic set-ups



...and placed in one of three different hydroponic set-ups for 24 days

Results and conclusions

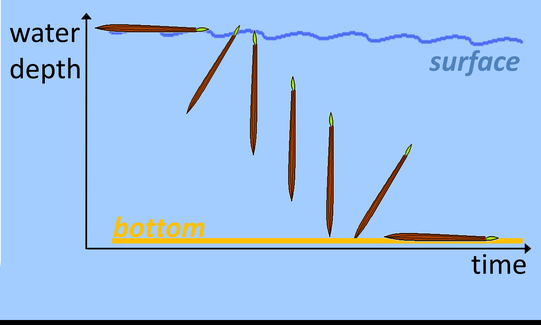
Between abscission and establischment:



-Propagules do not grow in length nor in diameter
-No root growth before the 13th day after abscission
⇒ **delayed dormancy period**

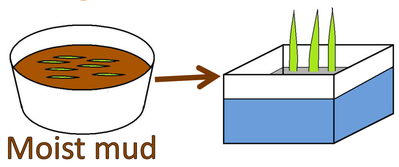
For both species: propagule volume and mass declined:
- most for propagules on dry sand
- least for propagules in sea water

For *C. tagal* propagules, the volume decreased more and faster than the mass
⇒ **density increased faster**
⇒ **clear buoyancy pattern**



During establischment:

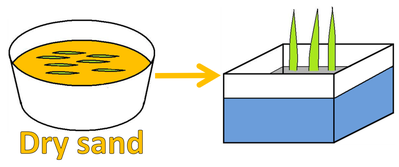
C. tagal:



- **longest** roots
- leafs start to grow

⇒ needs humidity to establish
⇒ energy first invested in root and leaf growh

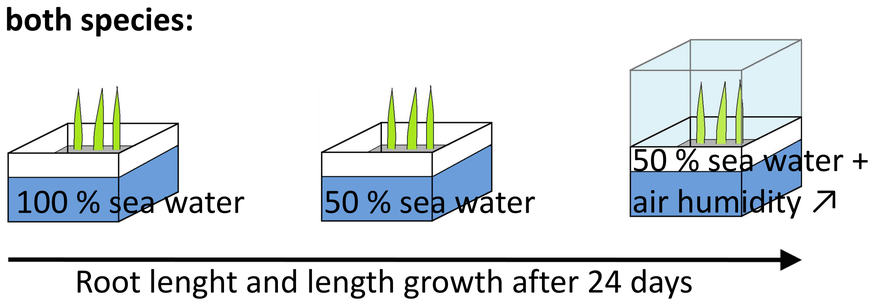
R. mucronata:



- start **first** to grow roots
- no leaf growth

⇒ needs dehydration to establish
⇒ energy first invested in root and length growth

For both species:



In agreement with distribution pattern in Gazi Bay:

***R. mucronata*: close to the sea**
→ high inundation frequency = hindrance for establishment → roots
→ closed canopy = limited light → length

***C. tagal*: close to the land**
→ low inundation frequency = water shortage → roots
→ open forest = no light limitations → leafs