Simultaneous measurements of water table level and carbon assimilation rates of Restinga Forest trees.

Carlos A. Joly & Viviane C. Oliveira

Plant Biology Department - Biology Institute
State University of Campinas
Campinas - São Paulo
BRAZIL


Caribbean Sea
VENEZUELA
GUYANA
SURINAME
French Guiana
COLOMBIA
ECUADOR
PERU
BRAZIL
BOLIVIA
PARAGUAY
São Paulo
CHILE
URUGUAY
ARGENTINA
50 W
N
SÃO PAULO
80 km
25 S
Serra do Mar State Park


S23.23°
S23.25°
S23.27°
S23.29°
S23.31°
S23.33°
S23.35°
S23.37°
W44.97°
W44.93°
W44.89°
W44.85°
W44.81°
W44.79°
W44.75°
Image © 2010 TerraMetrics
© 2010 MapLink/Tele Atlas
© 2010 Cnes/Spot Image
Image © 2010 DigitalGlobe
7.02 km
23° 18.845' S 44°51.239' O
elev 351 m
Altitude do ponto de visão 24.33 km
©2008 Google


UBATUBAMIRIM
Rod. Rio Santos
PICINGUABA
2644 m
23° 19.641' S 44°51.461' O
elev 634 m
Altitude do ponto de visão 9.15 k
Google




Tabebuia cassinoides
Bignoniaceae

Flora ▪ (▪▪▪) ▪▪▪–▪▪▪

Contents lists available at ScienceDirect

Flora

journal homepage: www.elsevier.de/flora

Germination and anaerobic metabolism of seeds of *Tabebuia cassinoides* (Lam.) DC subjected to flooding and anoxia

Rosana M. Kolb *, Carlos A. Joly

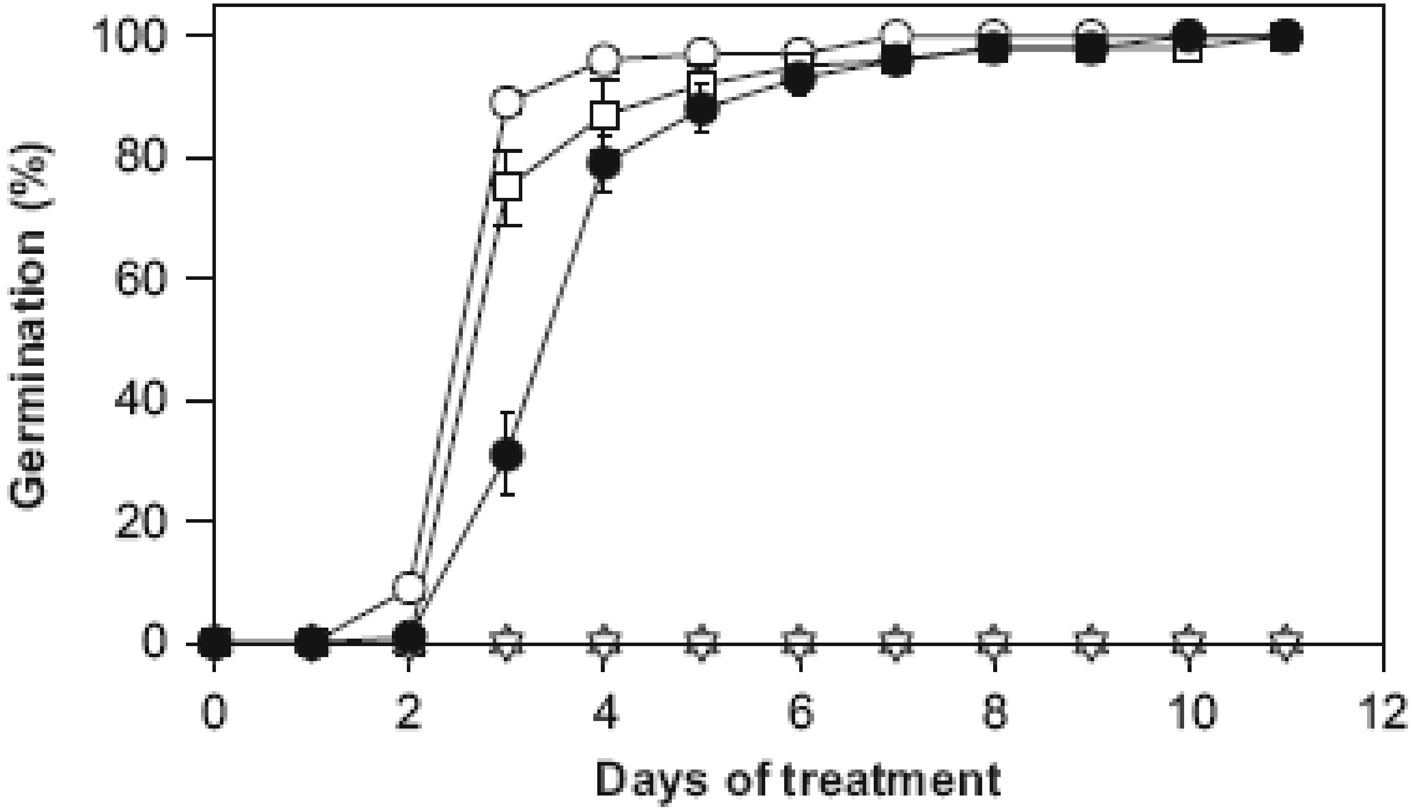

Fig. 2. Effect of light and of submergence (hypoxia) and anoxia on seed germination of *T. cassinoides*. Values are given as mean ± s.e. of five replicates each with twenty seeds: (○) normoxia light, (●) normoxia dark, (□) Partial submergence, (△) total submergence, (▽) anoxia.

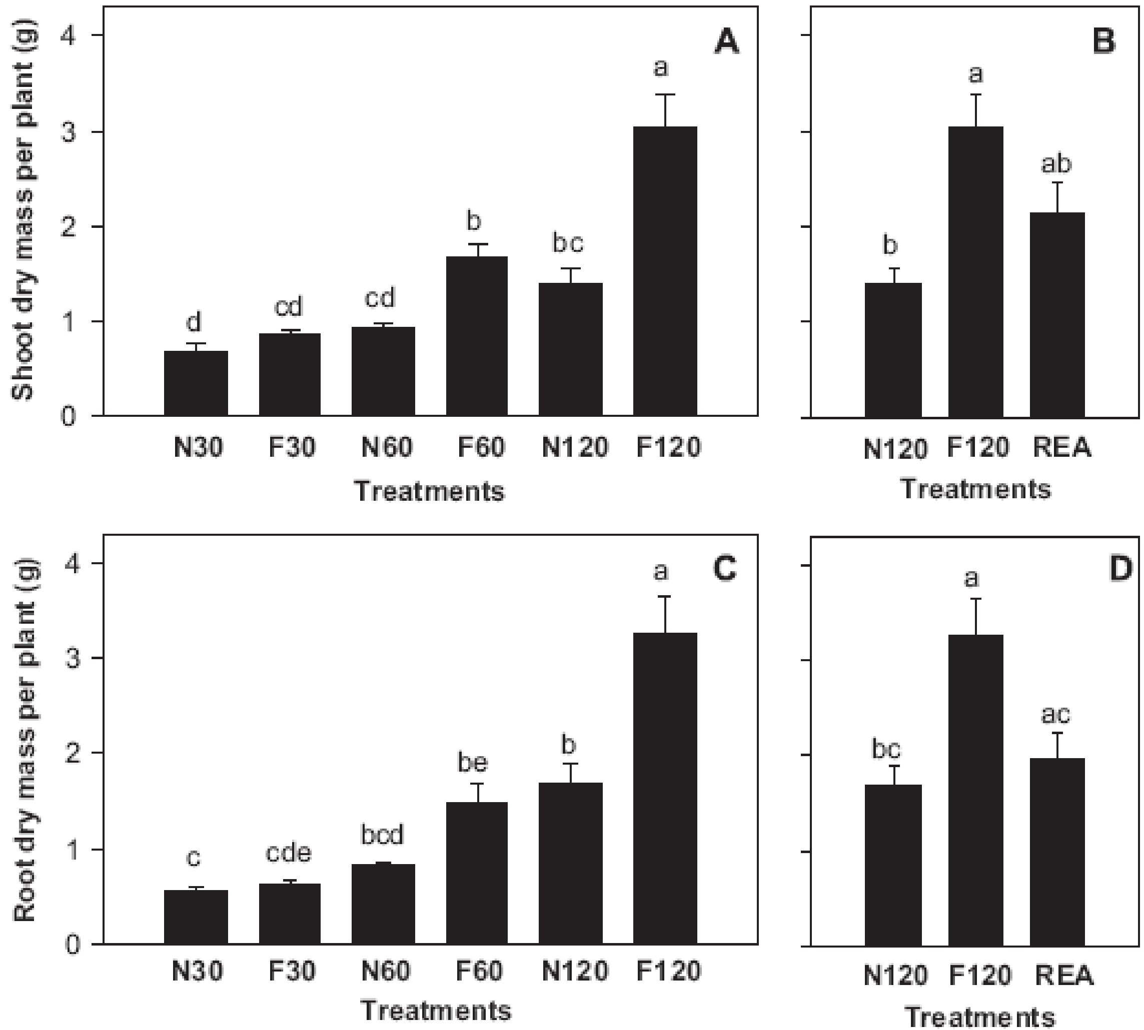

Fig. 5. Effect of flooding on shoot (A, B) and root (C, D) dry mass of *T. cassinoides* plants. N30, N60 and N120: 30, 60 and 120 d of normoxia; F30, F60 and F120: 30, 60 and 120 d of flooding; REA: re-aerated plants (60 d of flooding followed by 60 d under normoxia). Values are given as mean ± s.e. of five replicates. Significant differences among treatments are indicated by different letters.

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Flooding tolerance of *Tabebuia cassinoides*: Metabolic, morphological and growth responses

Rosana Marta Kolb*, Carlos Alfredo Joly

Erythrina speciosa
Fabaceae

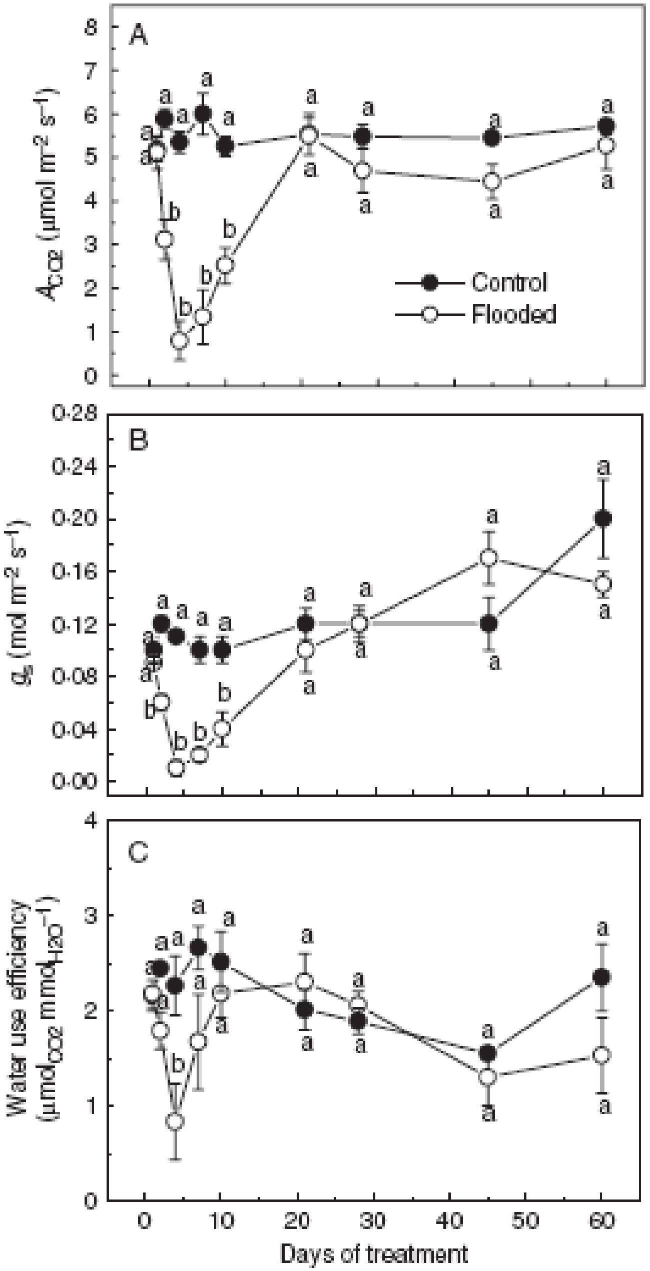


FIG. 1. Photosynthetic rates (A_{CO2}), stomatal conductance (g_s) and water use efficiency (WUE) in *Erythrina speciosa* under control and flooding conditions. Data are expressed as the mean ± s.e.; $n = 4$ leaves per treatment, each leaf from a different individual. Different letters indicate a significant difference between means ($P < 0.05$ %; Tukey test).

Annals of Botany **104**: 671–680, 2009
doi:10.1093/aob/mcp159, available online at www.aob.oxfordjournals.org

ANNALS OF BOTANY
Founded 1887

Erythrina speciosa (Leguminosae-Papilionoideae) under soil water saturation: morphophysiological and growth responses

Camilo L. Medina[1], Maria Cristina Sanches[2,*], Maria Luiza S. Tucci[3], Carlos A. F. Sousa[4], Geraldo Rogério F. Cuzzuol[5] and Carlos A. Joly[1]

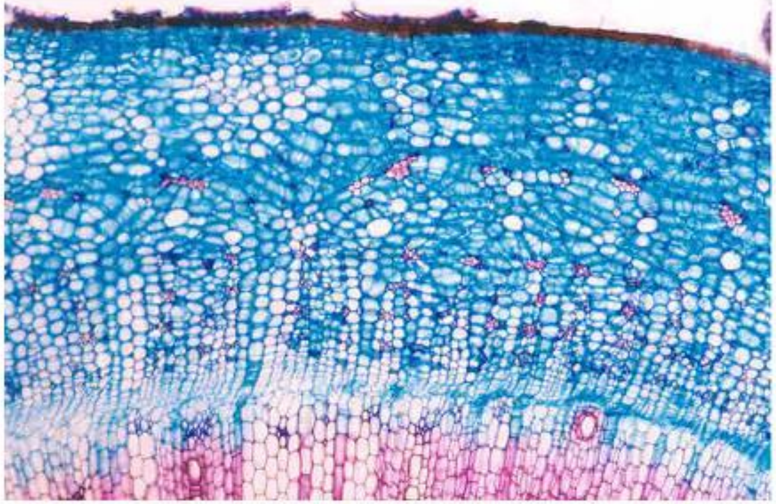
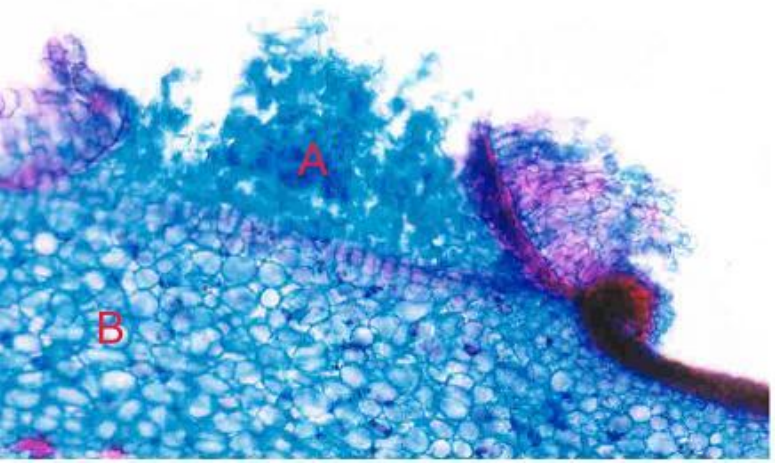


Figura 2A - Corte transversal de caule raiz de *Erythrina speciosa* controle. Aumento de 20x

Figura 2B - Corte transversal de caule de *Erythrina speciosa* submetida à saturação hídrica do solo por 60 dias. Notar a hipertrofia da lenticela (A) e o desenvolvimento de aerênquima (B). Aumento 20 x

Stem hypertrophyc lenticel



Root aerenchyma

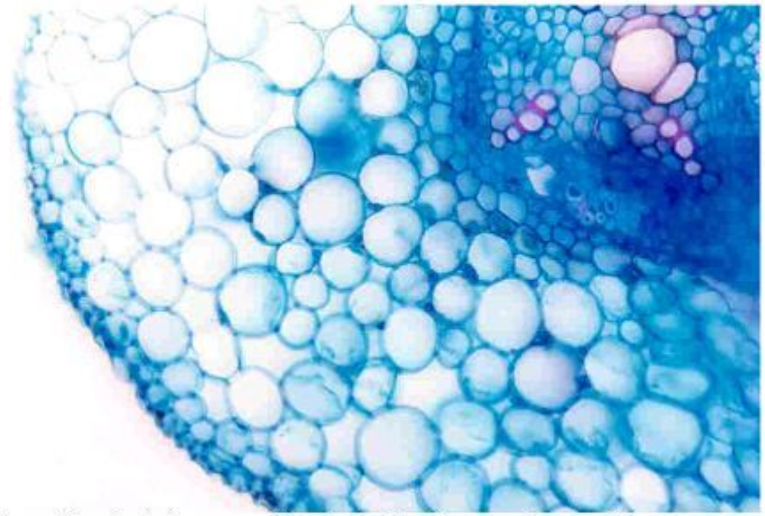


Figura 1A - Corte transversal de raiz de *Erythrina speciosa* controle. Aumento de 20x

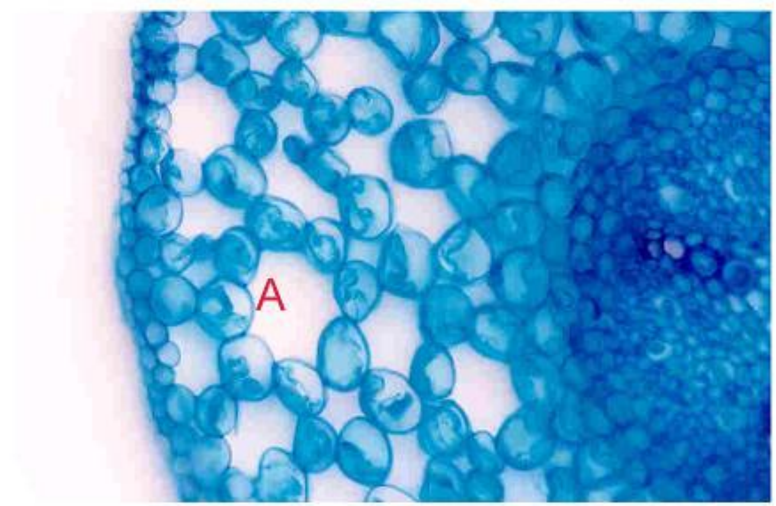


Figura 1B - Corte transversal de raiz de *Erythina speciosa* submetida à saturação hídrica por 60 dias. Note o grande desenvolvimento do aerênquima

Annals of Botany 104: 671–680, 2009
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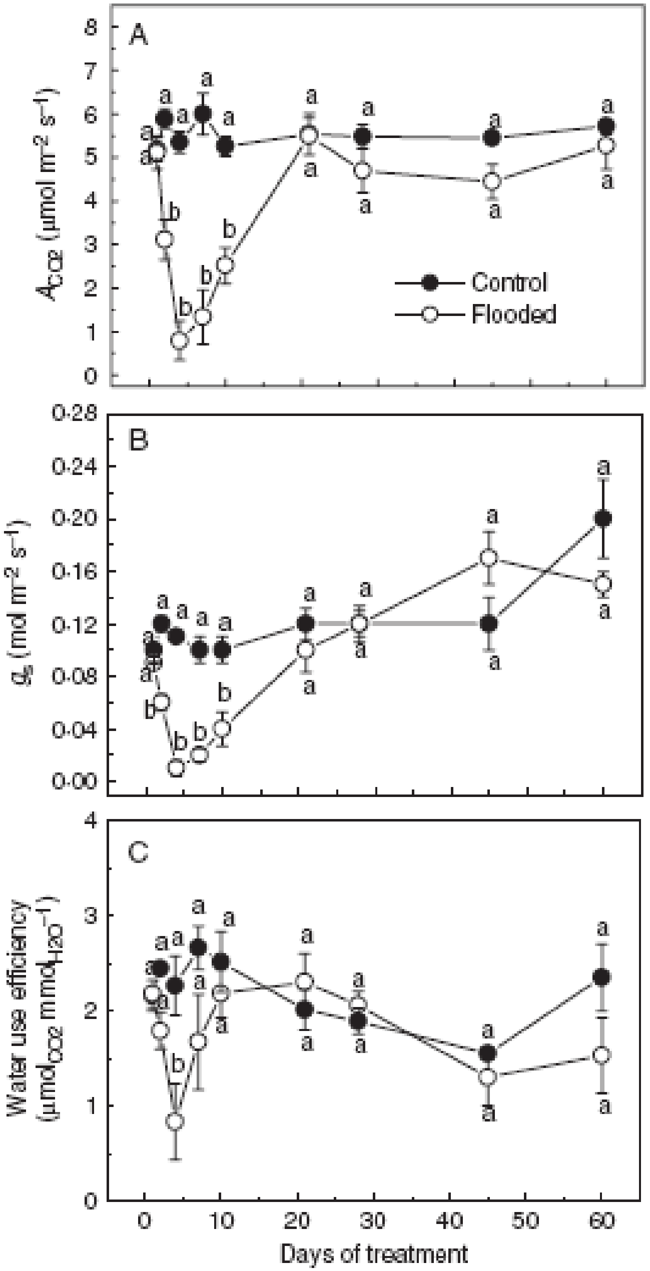


FIG. 1. Photosynthetic rates (A_{CO2}), stomatal conductance (g_s) and water use efficiency (WUE) in *Erythrina speciosa* under control and flooding conditions. Data are expressed as the mean ± s.e.; n = 4 leaves per treatment, each leaf from a different individual. Different letters indicate a significant difference between means (P < 0·05 %; Tukey test).

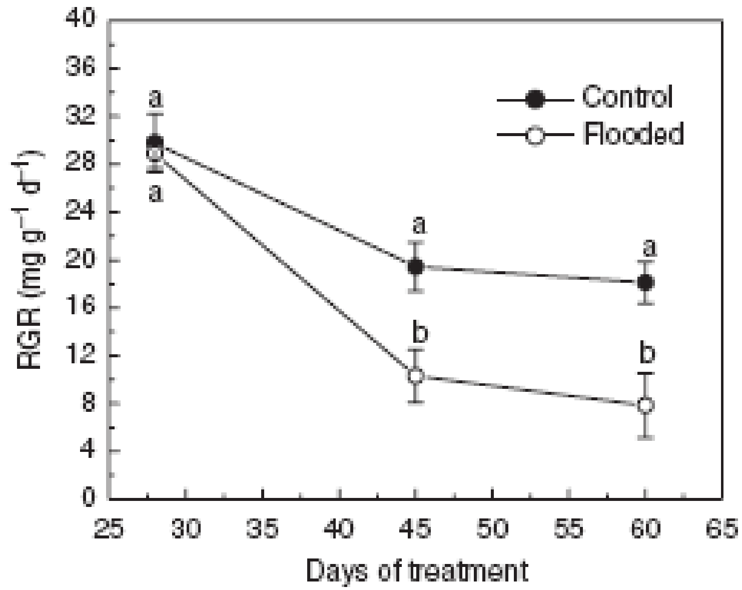
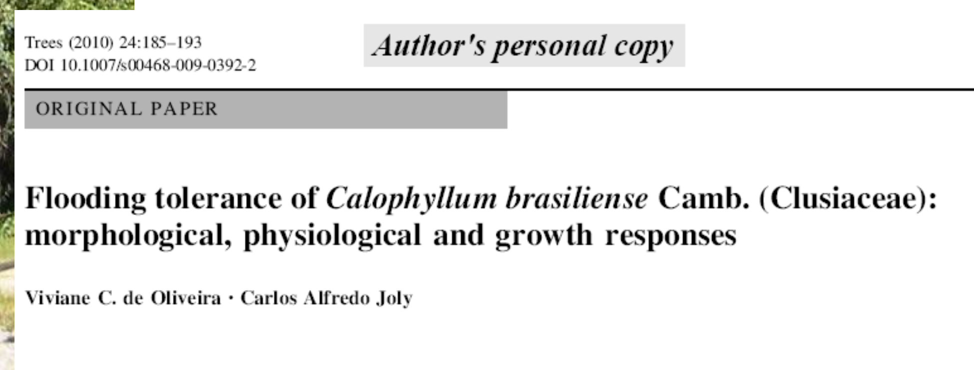


FIG. 6. Relative growth rate of *E. speciosa* under control and flooding conditions. Data are expressed as the mean ± s.e.; n = 6 plants in each treatment. Different letters indicate a significant difference between means (P < 0·05 %; Tukey test).

Calophyllum brasiliense
Clusiaceae

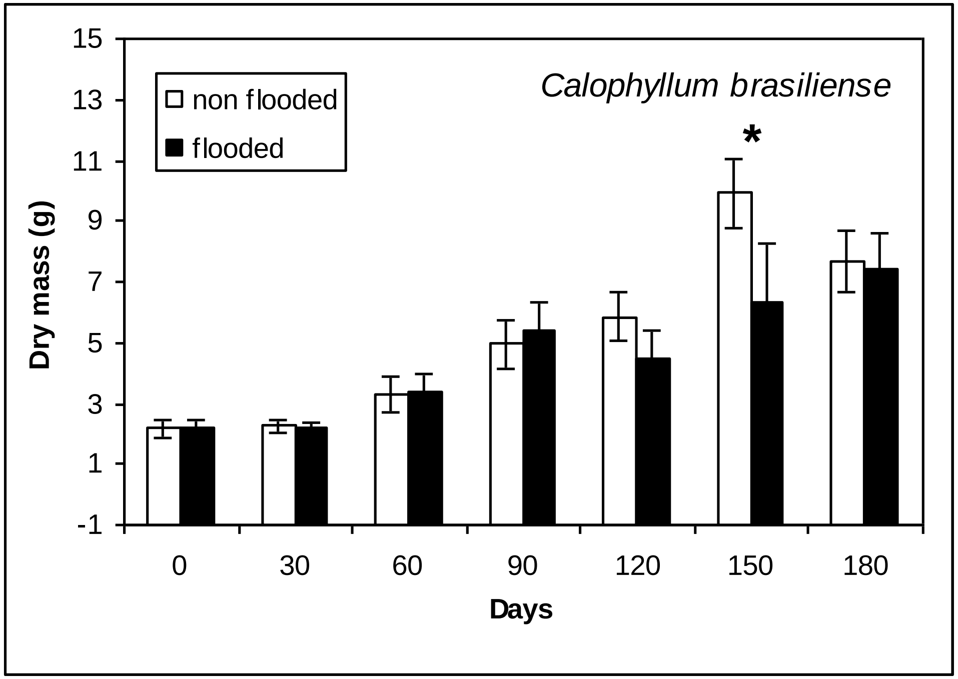


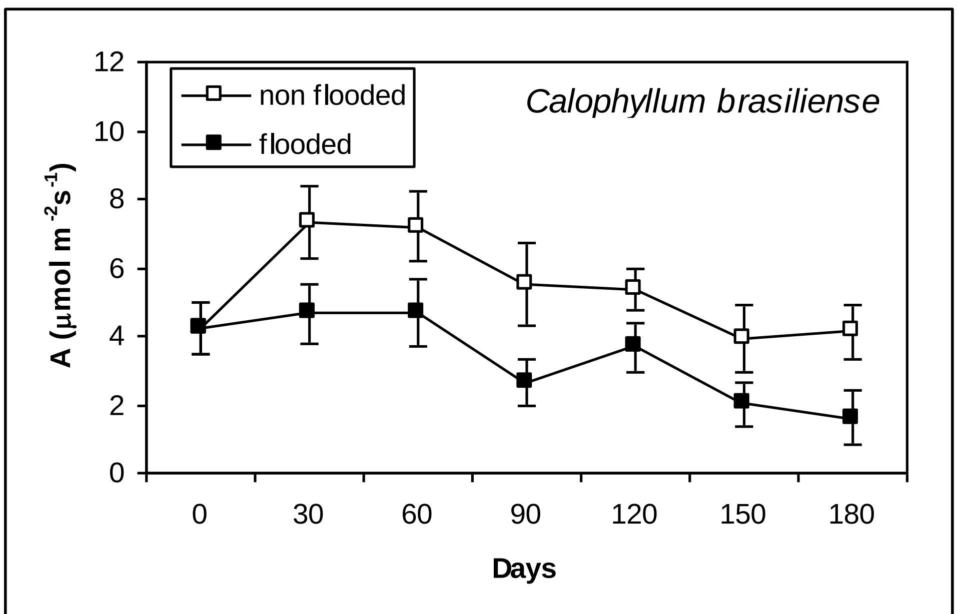
Trees (2010) 24:185–193
DOI 10.1007/s00468-009-0392-2

ORIGINAL PAPER

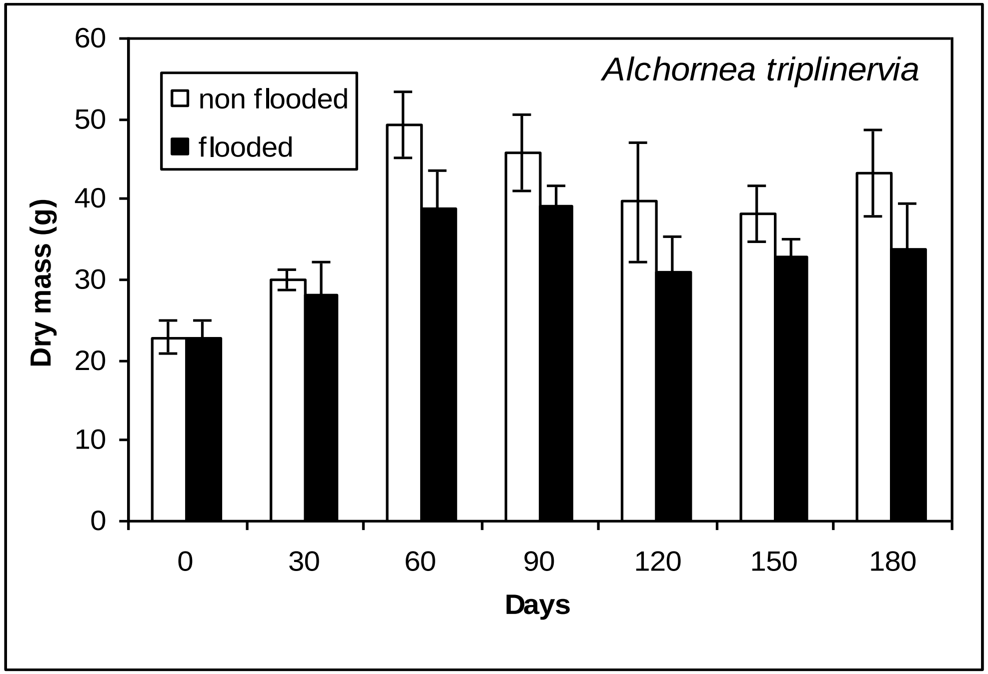
Flooding tolerance of *Calophyllum brasiliense* Camb. (Clusiaceae): morphological, physiological and growth responses

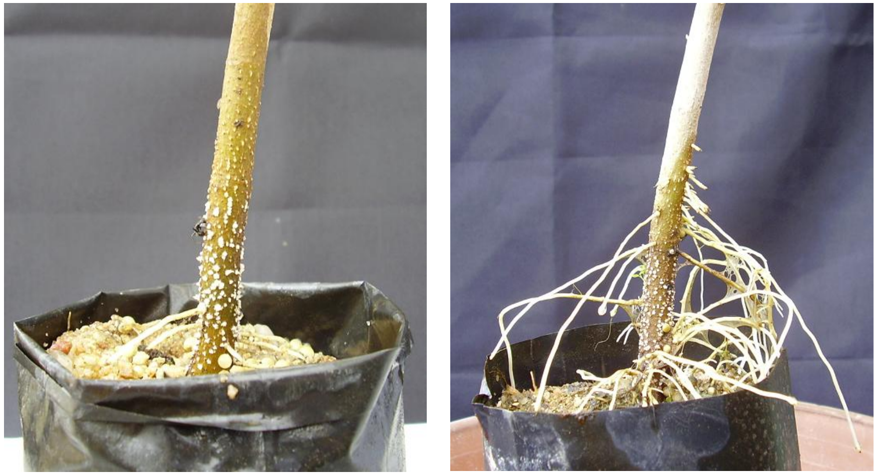
Viviane C. de Oliveira · Carlos Alfredo Joly



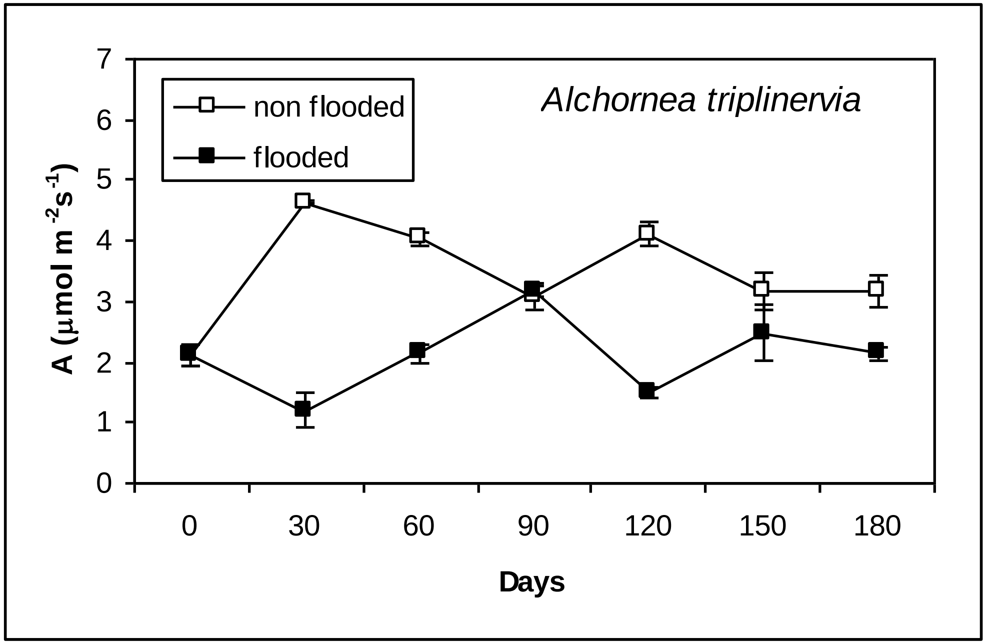


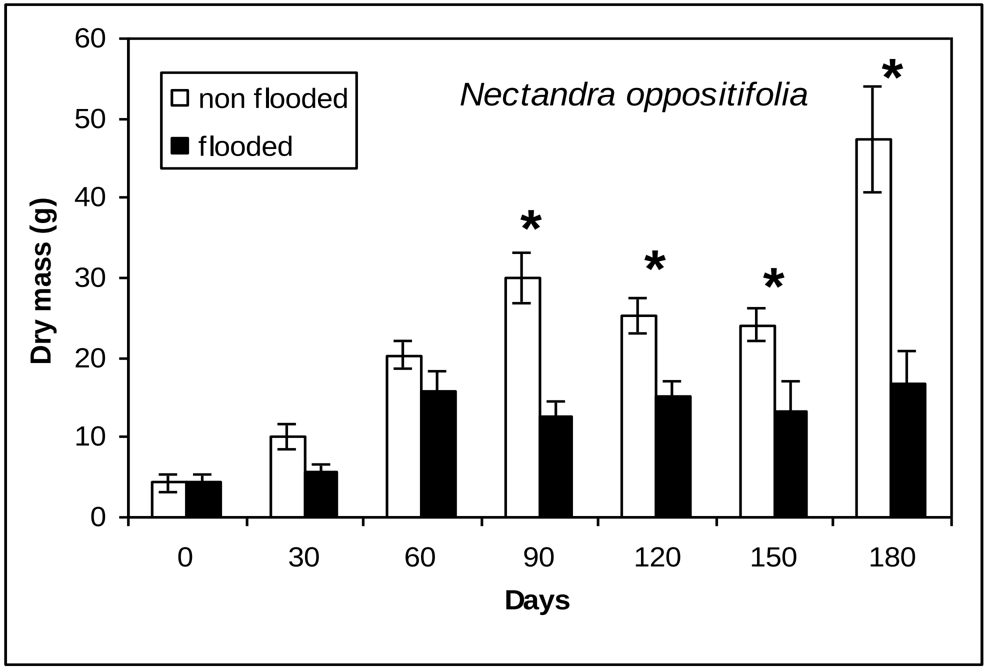
Calophyllum brasiliense after 30 and 120 days of flooding – lenticels hypertrophy





Alchornea triplinervia after 15 and 30 days of flooding, showing hypertrophyc lenticels and adventitious roots.





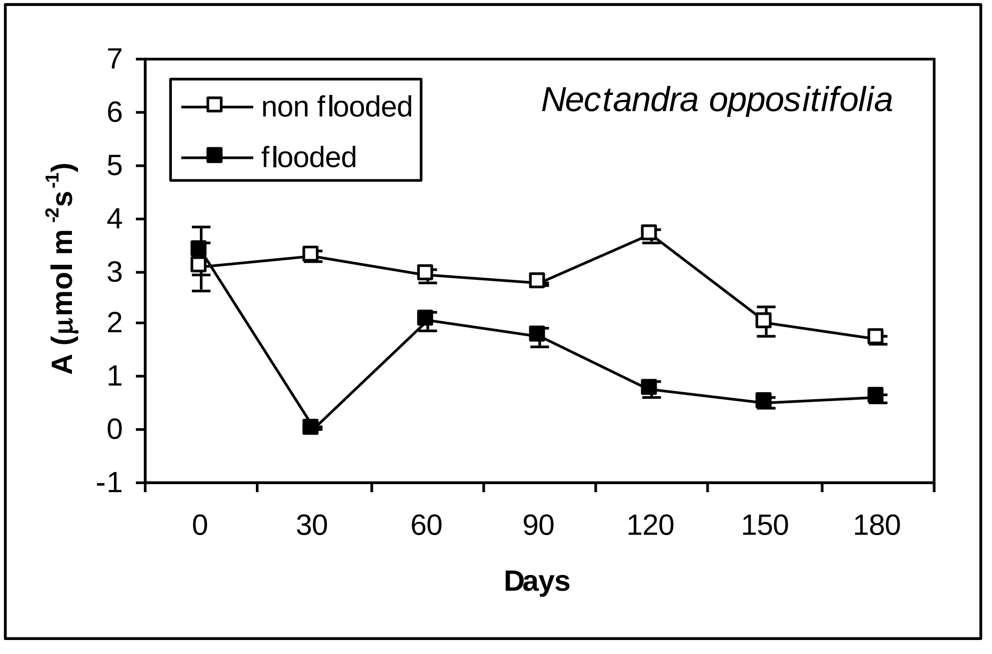
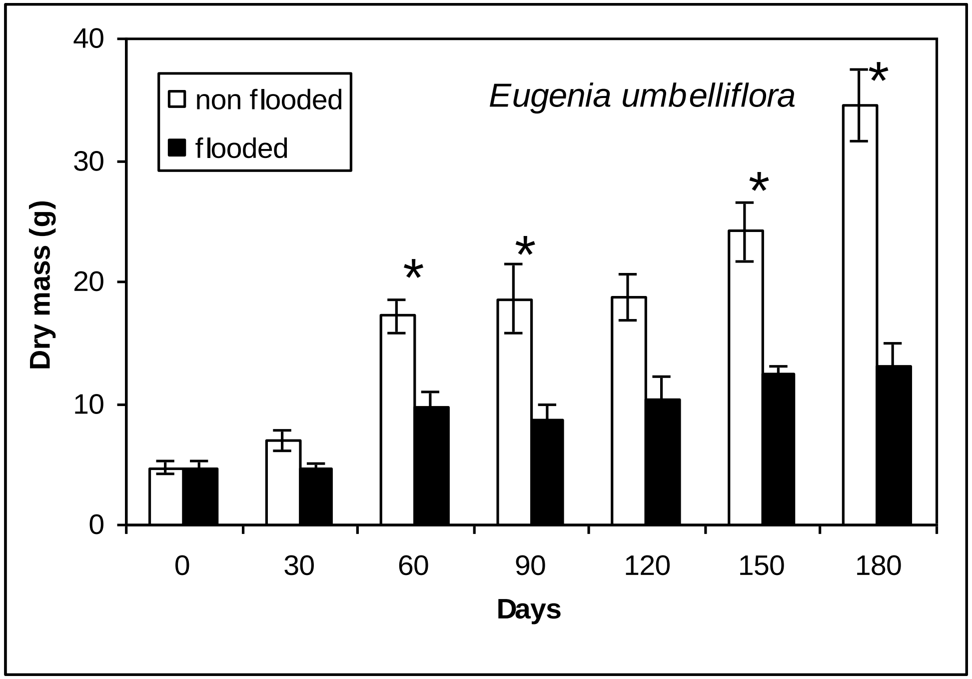
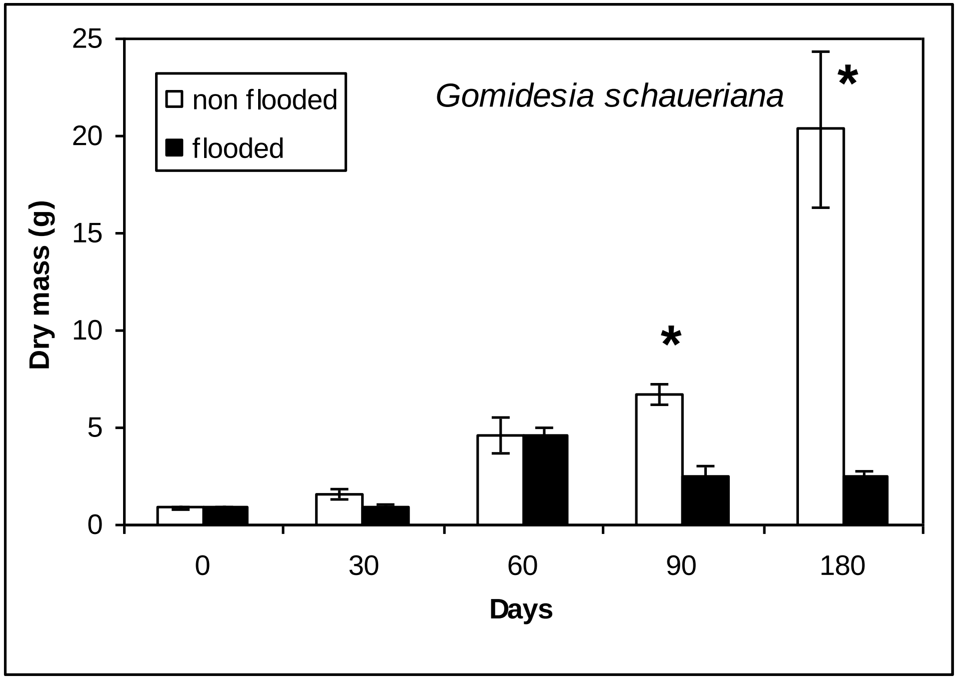


Fig 3. *Nectandra oppositifolia* após 30 dias de alagamento (lenticelas hipertrofiadas).



Eugenia umbelliflora after 60 days of flooding. **NO** adventitious roosts & **NO** hypertrophyc lenticels.



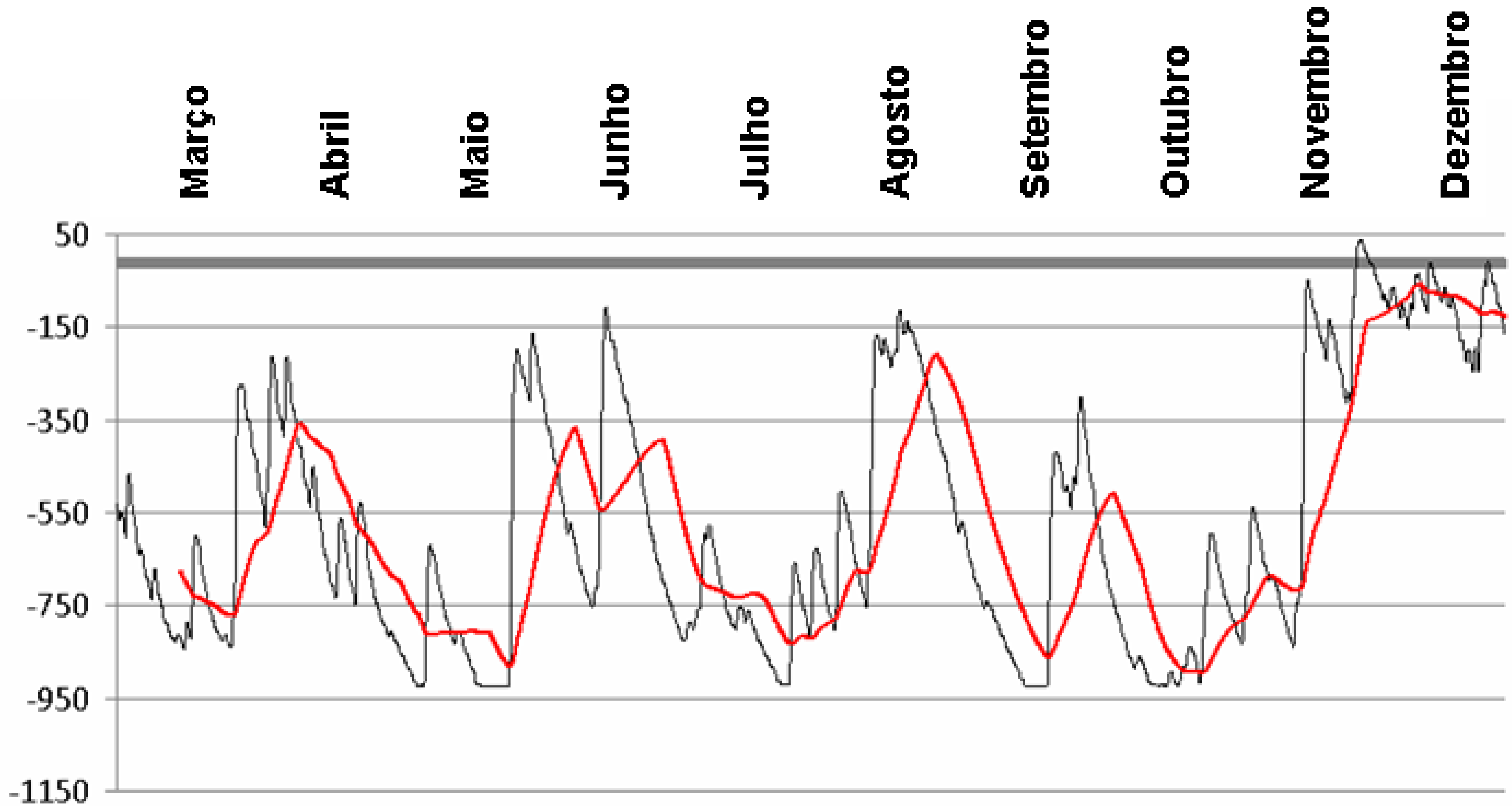
Gomidesia schaueriana after 60 days of flooding. **NO** adventitious roosts & **NO** hypertrophyc lenticels

Tabebuia cassinoides is the only *Restinga* tree in which flooded plants grew more than control plants.

Erythrina speciosa, *Calophyllum brasiliense*, *Alchornea triplinervia* and *Nectandra opositifolia,* flooding induced reductions in growth rate, but plants were able to survive and showed some morphological changes.

Eugenia umbelliflora, Gomidesia schaueriana and *Guapira opposita* flooding induced a strong reduction of growth and, in some cases lead to plant death.

RESTINGA trees show a variety of strategies to survive in flood prone areas, coupling structural morpho-anatomic and physiological adaptations.



Water table level in the RESTINGA FOREST – Picinguaba, Ubatuba/SP, Brazil

RESTINGA trees show a variety of strategies to survive in flood prone areas, coupling structural morpho-anatomic and physiological adaptations.

These strategies rely on a very fine balance between length of the flooding period, proportion of sand-clay-silt in the soil and height of water above soil surface.

Sea level increase, due to global warming, will induce changes in flooding regime, increasing the period that Restingas will stay waterlogged, and may also result in changes on the height of water above soil surface. These changes will have a selective effect upon species and may result in a significant increase in the area occupied by single species stands of *Tabebuia cassinoides*.


Thank you !