

Effects of experimental submersion on survival, growth, and dry biomass allocation of the rare salt marsh plant *Limonium girardianum*



In order to define the flooding tolerance capacity of *Limonium girardianum* according to growth development stage, we submerged 200 seedlings and 200 four-month-old juveniles in fresh water. During the eleven weeks of the experiment, we recorded the survival, growth and dry biomass of both seedlings and juveniles. Every week, we removed a group of ten seedlings and ten juveniles from submerged conditions and put them in drained conditions. We measured the leaf production rate and variation in total leaf area of both seedlings and juveniles. We measured the final above and below-ground dry biomass for both seedlings and juveniles. The seedlings started to die from week-2, while juveniles started to die from week-7. Fifty percent of seedlings died over a six weeks period, while fifty percent of juveniles died over a ten-week period. Beyond seven weeks and nine weeks for seedlings and juveniles respectively, total submersion stopped growth, and delayed leaf production and the increase of the total leaf area. Above-ground dry biomass significantly decreased from 30 g to 10 g for seedlings and from 30 g to 25 g for juveniles, according to flood duration. Below-ground dry biomass percentage

increased from 60% to 80% between week-4 and week-7 for seedlings. Below-ground dry biomass of juveniles decreased from 80% to 50% between week-4 and week-9. Our study showed that flood-prone plant species have a different response to flood conditions according to the developmental stage. The higher sensitivity to submersion of seedlings is due to its lower survivorship, lower leaf production, lower growth and more important dry biomass decrease than juveniles. This statement can be seen as a threat for population viability in the long term since human activities, such as construction of heavy industrial infrastructures and roads, induces too long flood duration that would compromise the persistence of *L. girardianum* populations.

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Obtenir le document : Université d'Aix-Marseille - IMBE

Mots clés : ESPECE PROTEGEE, FLORE, NIVEAU D'EAU, MARAIS, CROISSANCE

Thème (issu du Text Mining) : MILIEU NATUREL

Date : 2012

Type de ressource : Article scientifique

Format : text/xml

Identifiant Documentaire : PRLM5763

Langue : Anglais

Accéder à la notice source : <http://85.31.222.100/alexandrie-7/dyn/portal/index.seam?page=alo&alold=5763>

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