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Growth responses to flooding intensity in *Lotus tenuis*

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Flooding is an essential component of the disturbance regime affecting the vegetation dynamics of the Flooding Pampa Grasslands, with variable intensity among years. *Lotus tenuis* is an exotic species introduced in these grasslands, which presence is highly desirable because their forage quality. The aim of this work was to examine the effects of different flooding levels on the growth of *Lotus tenuis* during a 30 days period, and their relation with the aerenchyma formation and functionality under intense flooding leading to plant submersion. Four treatments were applied by 30 days following a completely randomized design with six replicates: control: watered daily to field capacity, waterlogged: soil saturated with water but without water above soil surface, flooded: water maintained at 6 cm above soil surface, and submersion: plants were completely underwater without emerging leaves. Plants were established in grassland soil pots of 4L. At the end of experiment tissue porosity (shoot and root), shoot number and plant biomass were measured. Results showed that constitutive shoot porosity was higher with amounts of 26% for most treatments, and was increased only by flooding until 40% ($p<0.01$). In all treatments involving water excess, root porosity was two-fold higher than under control conditions ($p<0.05$). Shoot number was similar at control, waterlogged and flooding treatments ($p>0.2$), but was 50% lower in plants subjected to full submersion ($p<0.05$). Plant growth was negatively affected at increasing flooding intensities: waterlogged, flooded and fully submerged plants attained 75%, 54% and 22% of plant biomass when compared to control ones ($p<0.05$). In conclusion, there is a close relationship between the growth capacity of *Lotus tenuis* at flooding conditions and their ability to form functional aerenchyma. However, plant growth is severely affected, although importantly not plant survival, when the aerenchyma is not able to facilitate oxygen transport to submerged tissues due the lack of oxygen capture of the fully submerged plants.