

## **Interactive effects of trampling and flooding on the growth of *Lotus tenuis* in grassland mesocosms of the Flooding Pampa**

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Flooding and trampling are two major disturbances affecting vegetation dynamics of the Flooding Pampa (Argentina). Continuous grazing and the periodic occurrence of floods determine that trampling of the flooded grassland is a common situation in the region. In these grasslands, which lack of abundant native legumes, the introduction and persistence of *Lotus tenuis* Waldst. & Kit. (syn. *Lotus glaber* Mill.) is a desirable situation because it increases the forage quality of the grassland. The objective of this work was to investigate the impact of flooding and trampling on plant cover and aerial biomass of the functional groups of graminoids and dicots, and of *L. tenuis*, growing in mesocosms of natural grassland. To this end, twenty soil monoliths supporting natural vegetation (*i.e.* mesocosms of 0.8×0.5×0.35 m depth) were extracted and transferred to the experimental garden of the Faculty of Agronomy (UBA). Mesocosms were initially similar in floristic composition, soil cover, vertical distribution of the canopy and abundance of *L. tenuis*. After 45 days of acclimatization, mesocosms were subjected to a combination of trampling and flooding in a completely randomized design (n=5). The flooding lasted 40 days while trampling was made at day 20 by covering 52% of the surface of the mesocosms. Flooding increased by two-folds the cover of graminoids ( $P<0.001$ ) and reduced that of dicots by 20% ( $P<0.05$ ), without affecting plant cover of *L. tenuis* ( $P>0.05$ ). Trampling, as unique disturbance, provoked a slight lower cover (18-23%) of both functional groups and of *L. tenuis* ( $P<0.05$ ). The combination of flooding and trampling resulted in a reduction of the cover of dicots by 76% ( $P<0.001$ ) without affecting it in graminoids. In this case, trampling of flooded soil reduced the cover of *L. tenuis* by 80% with respect to control mesocosms ( $P<0.01$ ). The aerial biomass was 30% higher in the flooded mesocosms due to a promotion of graminoids biomass ( $P<0.01$ ), which compensated the lower biomass attained by dicots ( $P<0.01$ ). Trampling and flooding, as individual disturbances, derived in a lower biomass (21-24%) of *L. tenuis* in the mesocosms in comparison to controls ( $P<0.05$ ). Trampling of the flooded grassland did not affected total aerial biomass, but resulted in a significant decrease in the biomass of dicots species ( $P<0.01$ ), especially of *L. tenuis* that registered only a biomass of 10-15% with respect to all other treatments ( $P<0.01$ ). Under such conditions, (trampling plus flooding) the graminoids concentrated 90% of total aerial biomass. In conclusion, this disturbance combination did not affected biomass production of the grassland. However, trampling of the flooded grassland altered the quality of the forage by drastically reducing

the biomass of the legume *Lotus tenuis*.