Contribution of forest plantations to soil phosphorus reserves

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INTRODUCTION

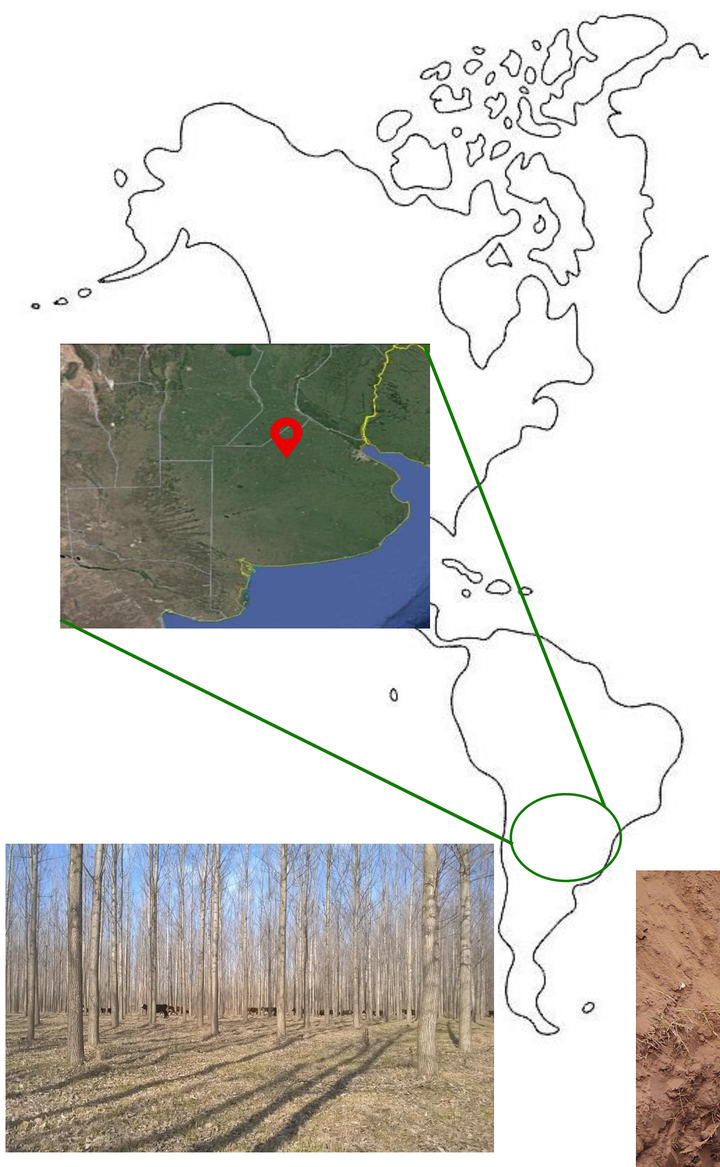
Forest plantations represent a productive alternative in the Argentinean Pampas and little is known about how their use impacts on soil phosphorus (P).

AIM

Evaluate the Total P (TP) reserves in poplar plantations (*Populus* spp) with different ages and in a continuous agriculture system with more than 40 years.

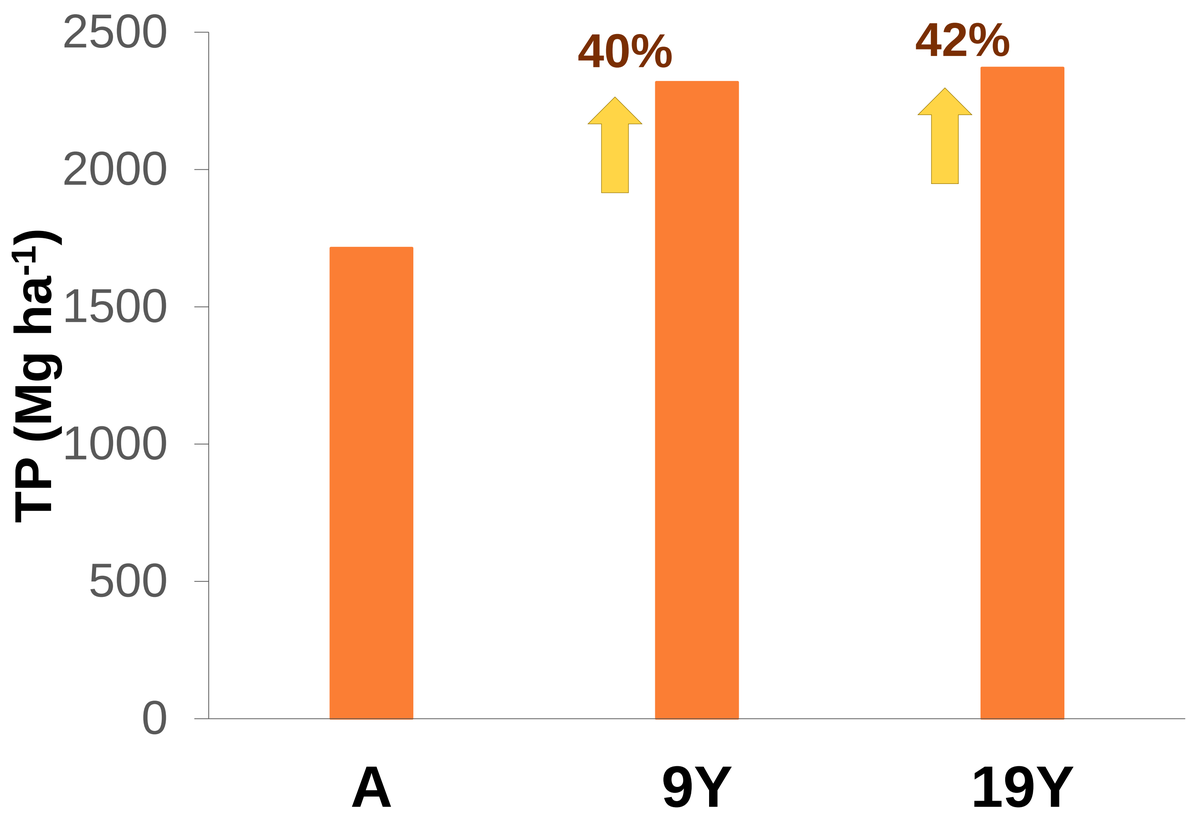
MATERIALS AND METHODS

The study was carried out in the Pampas region (Argentina) through a completely randomized design with 3 repetitions on an Entic Hapludol soil (clay 8,5%, silt 9.3% and sand 82,2%). Treatments were: 1) Poplar stand 1: 9 year old plantation (9Y); 2) Poplar stand 2: 19 year old plantation (19Y) and 3) an agricultural site (A). Soil samples were obtained, from which the concentration of TP and bulk density (BD) were measured. Since BD showed differences between treatments, we calculated TP values at same soil mass.



RESULTS Y DISCUSION

The TP mean reserves at 0-100 cm were 1714, 2318 and 2370 Mg ha^{-1} for agricultural site (A), 9 years (9Y) and 19 years (19Y) old plantations, respectively. The forest plantation increased TP reserves by 40% and 42% compared with agriculture site ($p<0.07$). We hypothesize that this increase was due to the absence of grain extraction and the mitigation of runoff losses. Plantation of fast-growing forest species produced significant changes in TP reserves.



CONCLUSION

Forest plantations present higher levels of TP content compared to agricultural sites. This is due to several factors, including intrinsic nutrient cycling processes inherent to forest ecosystems, lower land use intensity, lower nutrient export, and mitigation of runoff losses.