

Growth, nitrogen and phosphorus economy in two *Lotus glaber* Mill. cytotypes grown under contrasting P-availability

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Introduction *Lotus glaber* Mill. (lotus) is a forage legume with its origin in Europe which has shown an excellent adaptation to the Depressed Pampas of the Province of Buenos Aires, Argentina. The soils colonized by lotus usually have poor drainage, moderate sodium and low extractable P concentrations. An experiment was performed with the aim of comparing the early growth and economy of phosphorus (P) and nitrogen (N) within two *L. glaber* cytotypes differing in their ploidy level, a commercial diploid versus an induced autotetraploid population (Barufaldi *et al.*, 2001).

Materials and methods Plants were grown outdoors under two contrasting P-availabilities from January to April 2003 in soil-filled pots kept at field capacity. The experimental design was a 2x2 factorial consisting of two *L. glaber* cytotypes (tetraploid population-denominated Leonel and diploid cv. Chaja) and two P-fertilisation levels (0 and 100 ppm of P as triple superphosphate). The original extractable P concentration was 4 ppm. At transplanting, all germinated seeds were inoculated with 10^{10} cells per plant of a commercial inoculant (strain LL32). Twenty plants were harvested at days 46, 74 and 102 after germination and in each plant component, P and nitrogen concentrations were determined.

Results In addition to the greater growth of all fertilised plants, both ploidy types showed a similar growth rate (RG) and relative growth rate (RGR) at each P availability. As shown in Figure 1, variability of biomass of dry matter was greater for tetraploid plants than for diploid ones. Tetraploid plants showed the heaviest individual plants.

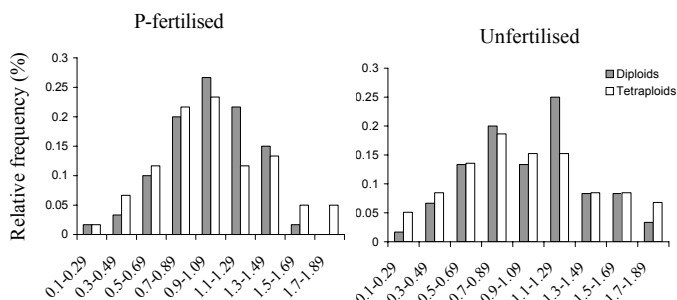


Figure 1 Distribution of relative frequencies of standardised plant biomass in two *L. glaber* cytotypes. At each harvest, plant biomass was standardised by dividing the actual biomass by the corresponding mean value.

P concentration was similar between ploidy types at both P levels. No differences were found either for P-absorption and P-utilisation efficiencies or P-partitioning between shoots and roots. As was expected, P-fertiliser application increased P-uptake and reduced P-utilisation efficiencies, but partitioning was not affected with either ploidy type. Neither N concentration nor N-use efficiency were different between ploidy types. Differences in N content observed between P availabilities were partially attributed to the higher number of nodules observed in high P plants.

Conclusion This preliminary study demonstrates that no differences were found in the analysed variables when comparing an induced polyploidy of *L. glaber* with a commercial diploid cultivar. In the tetraploid, superior plants for biomass were observed which could lead to improvements in this character by means of a recurrent selection programme.

References

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