

Phosphorus
in Soils
and Plants
Symposium

*Towards a sustainable
phosphorus utilization in
agroecosystems*



abstracts



**Theme 4 - Sustainable
intensification of phosphorus
supply in food production
Poster Session**



Effect of phosphate fertilization on nitrogen use efficiency of forage pastures. 1. Tall fescue pastures

Marino, M.A.*¹; Errecart, P.M.²; Cicore, P.L.²; Borrajo, C.I.³; Wyngaard, N.^{1,4}; Laplacette, C.⁴; Insua, J.^{1,4}; Cuadro, R.⁵; Lattanzi, F.⁵; Berone, G.D.^{1,2}

¹Facultad Ciencias Agrarias-UNMDP. RN226, km73,5;

²INTA-EEA Balcarce;

³INTA-Cuenca del Salado. ⁴CONICET; ⁵INIA

*marino.mariaa@inta.gob.ar

Nutrients deficiencies - mainly phosphorus (P) and nitrogen (N) - often depress forage productivity (FP) in pasture-based systems in the Pampas region (Argentina). Fertilizations are often used to attenuate these deficiencies, but it is necessary to increase the use efficiency of the applied nutrients. The FP and the response to N fertilization (i.e. agronomical N use efficiency, NUE) of TF was studied with and without P supply in rainfed tall fescue pastures. The experiment was conducted from 29-07-21 to 26-11-21 (mean air temperature: 13.2°C, precipitation: 197 mm, potential evapotranspiration: 330,7 mm) in a tall fescue (*Lolium arundinaceum* (Schreb.) Darbysh) pasture on a typical Natracualf (pH 8.9, P-Bray 5.8 mg kg⁻¹; organic matter 3.4%). The P treatments (0 and 50 kg P ha⁻¹) and N treatments (0, 50, 100, 200, and 400 kg N ha⁻¹) were applied using a factorial design in randomized blocks with three replications (plots size: 1.5x4 m). Accumulated forage was harvested (0.1 m², 3 cm above ground level), was dried and weighted to establish the PF (kg DM ha⁻¹). The NUE was calculated as (FP_{N_x} - FP_{N₀})/N_x (x is the N level of treatment and N₀ the control for each P rate). Potential models were fitted to explain the association between NUE and applied N. Applied N and P increased FP and NUE (p<0.05), no significant interactions observed. The N application increased FP from 3001 kg DM ha⁻¹ (0N) to 6110 and 6632 kg DM ha⁻¹ (200N and 400N, no difference between them), and with P application from 4843 kg DM ha⁻¹ (0P) to 5482 kg DM ha⁻¹ (50P). Greater NUE were obtained with 50P than with 0P and in both cases decreased with increasing the N dose. Potential models were adjusted for each P treatment (Figure 1). Additional research is needed to improve management of pasture nutrition in temperate-humid regions.

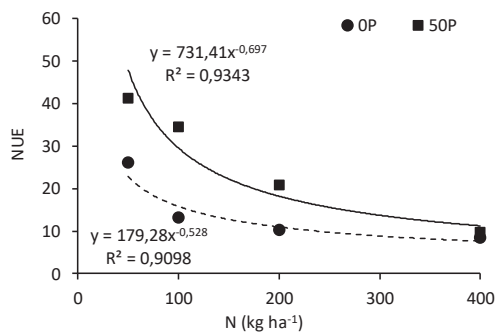


Figure 1. Nitrogen use efficiency in relation to N applied and potential models adjusted for each P treatments (OP: circles and discontinued line; 50P: squares and continued line).