



**Phosphorus**  
**in Soils**  
**and Plants**  
**Symposium**

*Towards a sustainable  
phosphorus utilization in  
agroecosystems*



# abstracts

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**Theme 2 - Phosphorus  
acquisition by plants and  
microorganisms  
Poster Session**

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## Effect of phosphate fertilization on nitrogen use efficiency of forage pastures 2. Annual Ryegrass

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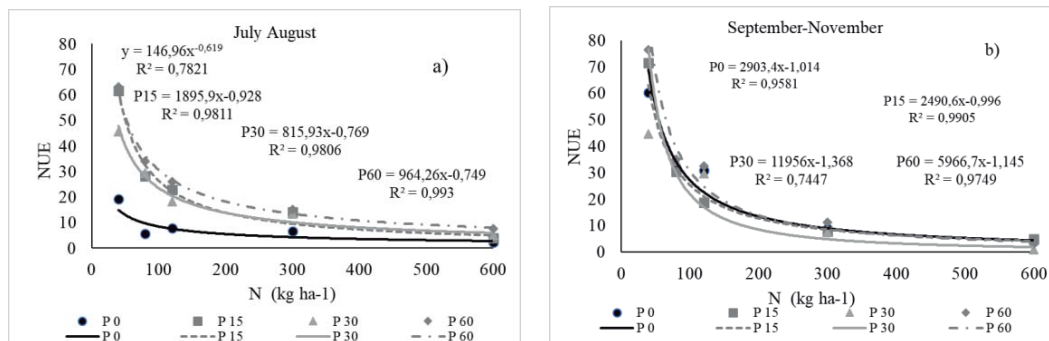
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Pasture response to N fertilization and the nitrogen use efficiency (NUE) is highly conditioned by the phosphorus (P) availability and soil water. The objective of the study was to evaluate the effect of NP fertilization on the NUE of annual ryegrass, in two growth periods. Two experiments were installed on a Clay loam, Vertic Argiudoll soil (P level citric acid methods: 4.3 mg kg<sup>-1</sup>; pH= 5.8) in Uruguay. P levels were applied at sowing (0, 15, 30 and 45 kg P ha<sup>-1</sup>) and six levels of N (0, 40, 80, 150, 300 and 600 kg N ha<sup>-1</sup>) were applied on 15 June (winter experiment, E1) and on 24 August (spring experiment, E2). The accumulated biomass (BA) was evaluated during periods June-August (80 days, main air temperature 11.5 °C, precipitation 143 mm) and September-November (60 days, main air temperature 17.0 °C, precipitation 264 mm) for E1 and E2, respectively. The NUE was calculated as (BANx-BAN0)/Nx (x is the N level of treatment and N0 the control for each P level). In both periods, the NUE decreased with increasing N levels. In E1 (Figure 1a) N and P application increased the NUE (p<0.05) without interactions between nutrients. There were significant differences in the P treatments compared to the control, without differences between the levels applied. The N40 level was the one with the highest NUE in the two growth periods. In E2 (Figure 1b), no significant differences were observed between P levels. Additional information is being analyzed to explain the different responses found between the two periods evaluated.



**Figure 1.** Nitrogen use efficiency by growth period evaluated (a: June-August; b: September-November) in relation to N applied and potential models adjusted for each P treatments.