



## **Effect of fertilization in interaction with glyphosate on the availability of phosphorus in rice soils of Corrientes - Argentina**

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The rice crop (*Oryza sativa*) in the province of Corrientes, Argentina, represents 46% of the national production. To obtain potential yields, adequate practices of fertilization, pesticides application, and management of the irrigation system are needed. Nitrogen (N), phosphorus (P) and potassium (K) are key minerals in rice production. In Argentina, P deficiency is a common problem in rice crops and represents a main yield limiting factor, therefore P fertilization is a regular practice. On the other hand, glyphosate is widely used to control weeds. This molecule is rapidly inactivated in soil due to the adsorption to clay particles and organic matter, however, is excluded from adsorption sites by inorganic phosphates. Meanwhile, both practices of fertilization and herbicide application can interact and influence the phosphate nutrition of rice plants. The objective of this work was to evaluate the effect of different doses of fertilizer in interaction with glyphosate on the availability of soil phosphorus. A field experiment following a completely randomized design was carried out with four replicates. We evaluated four levels of fertilization (0-18-40): Control: 0 kg ha<sup>-1</sup>, Dose 1: 120 kg ha<sup>-1</sup>, Dose 2: 150 kg ha<sup>-1</sup>, Dose 3: 180 kg ha<sup>-1</sup>; and two levels of Glyphosate: with (Gly) or without (no-Gly) application. Soil sampling was carried out at three moments along crop season: vegetative stage before irrigation (V4), in floral primordial differentiation (DPF) with flooded soil, and at physiological maturity (MF). The method used for the determination of P was Bray & Kurtz I. We found a negative relation and non-significant interaction ( $p < 0.05$ ) between P and Gly contents in soil along crop season. Soil P was higher in Gly treatments compared with ones without application of the herbicide. Indeed, Dose 1 showed higher P contents in Gly during the three sampling stages of the crop, whereas for Doses 2 and Doses 3 the highest contents of P were found in the treatments without Gly in V4, but the opposite in MF (i.e. higher soil P in Gly than no-Gly). This suggests that phosphate ions competed with glyphosate for adsorption sites and they were available in soil solution while herbicide molecules were retained by colloidal particles.