

UPLAND RICE DEVELOPMENT UNDER A NO-TILLAGE SYSTEM AS A FUNCTION OF GYPSUM AND PHOSPHORUS

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Rice is a food that is part of the diet of half the world's population, and most of this grain is grown in Asia using a controlled-flooding irrigation system. However, the reduced availability of water resources for irrigation of crops due to increasing industrial and human consumption has generated a demand for alternatives in the form of water-saving rice cultivation systems. As alternatives, rice could be cultivated in upland ecosystems, which can be sprinkler irrigated or not irrigated, depending on rainfall. As a component of these alternative cultivation methods, the no-tillage system (NTS), due to its characteristic of maintaining a covering of straw over the soil, could bring advancements to rice production as a result of greater retention of water in the soil. The use of gypsum in a no-tillage system may be a viable alternative for cultivating upland rice, due to its capacity to carry nutrients to deeper layers of soil and stimulate root growth. Additionally, phosphorus is one of the nutrients that most limits crop production in the Brazilian Cerrado. For upland rice, data on the combined application of gypsum and P are still scarce and almost non-existent with regard to soil management carried out in an NTS. Thus, the objective of this work was to determine the effect of the combination of gypsum applied to the soil surface without tillage and P applied in the sowing furrow on soil attributes and the plant height, number of panicles m^{-1} and grain yield of upland rice cultivated in an NTS. The experiment was conducted using a complete randomized block experimental design with four replicates in a factorial scheme of gypsum doses (0, 1000, 2000 and 3000 $kg\ ha^{-1}$), phosphorus doses in the furrow (0, 50, 100 and 150 $kg\ ha^{-1}$) and growing seasons (2011/12 and 2012/13). For statistical analysis, SAS Statistical Software was used. Data were subjected to analysis of variance and, when necessary, compared by a Tukey test at $p < 0.05$. For quantitative data (rates of gypsum and P), in case of significance, results were submitted to regression analysis at $p < 0.05$. Gypsum application provides increments in the calcium amount in the soil and increases potassium levels in the deeper soil layers, but it does not affect the plant height, yield components or grain yield of upland rice cultivated under a no-tillage system. Increasing doses of phosphorus applied at sowing result in a significant increase in the plant height, number of panicles m^{-1} and grain yield of upland rice cultivated under a no-tillage system.

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