# COTTON NITROGEN FERTILIZATION IN THE SUCCESSION BRACHIARIA/COTTON UNDER NO–TILLAGE SYSTEM AND CROP-LIVESTOCK INTEGRATION IN THE BRAZILIAN CERRADO

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## Abstract

The Cerrado region is responsible for more than 87% of the total area of about 1.1 million hectares of cotton cultivated in Brazil, and over 92% of the country's lint production. In the Brazilian Cerrado, crop-livestock integration under no-tillage has been pointed out as a management system that results in higher yield and improved soil quality. Taking into consideration the expansion of no-tillage and the aspects related to crop succession/rotation, farmers have been searching for options regarding timing and method of fertilizer application, aiming mainly at higher operational yields, higher efficiency of fertilizer use, and cost reduction. Thus, an alternative could be the application of all or part of the cotton nitrogen fertilizer in the management of the grass species used as soil cover prior to planting. This practice presents operational advantages, such as more flexibility in the use of implements and labor force. The objective of this study was to evaluate the efficiency of applying all or part of the cotton nitrogen fertilizer to the preceding grass species (*Brachiaria brizantha*) under no-tillage and crop-livestock integration in the Brazilian Cerrado.

A field study was carried out in the state of Goiás, in 2004/2005 and 2005/2006 growing seasons, in an area of soil classified as Typic Haplustox. The experiment consisted of 12 treatments in a randomized complete block design with four replications in a 5x2+1+1 factorial arrangement: five methods of fertilizer application (100% pre-planting; 75% pre-planting + 25% topdressing; 50% pre-planting + 50% two topdressing applications; 50% pre-planting + 50% topdressing; and 25% pre-planting + 75% two topdressing applications), two periods of pre-planting application (before and after desiccation of brachiaria), one treatment of conventional fertilization (two topdressing applications), and one control (no application of nitrogen). A dose of 120 kg/ha N as ammonium nitrate was applied and all plots were also fertilized with 100 kg/ha $P_2O_5$, 140 kg/ha $K_2O$, and 3 kg/ha B, according to the recommendation for the region. The results indicated that, regardless of the timing and method of application, nitrogen fertilization increased lint yield in 17.7%, from 2,016 kg/ha to 2,373 kg/ha, when averaged over the two growing seasons analyzed. It should be emphasized that the yield without nitrogen fertilization was low, which confirms the importance of organic matter in the soil to supply this nutrient to the crop. Preplant nitrogen fertilization of the cotton crop resulted in the same yields as with conventional fertilization using two topdress applications. However, yield showed a tendency to decrease as the dose of nitrogen applied pre-plant was increased and the one used in topdressing was reduced. Furthermore, pre-plant application resulted in higher production of brachiaria mulch to cover the soil, incorporation of nitrogen applied in biomass (brachiaria and soil microbial biomass), and controlled liberation of nitrogen through mineralization, which makes its absorption by the cotton plants possible in the period of highest demand.