Abstract

The experiment was established in a eutric Vertisol; the treatments were generated with the Plan Puebla I Matrix (NUrea: 80, 120, 160, and 200; PTSP: 0, 40, 80, and 120; and K KCl: 0, 40, 80, and 120 kg ha⁻¹ of N, P₂O₅, and K₂O, respectively), and one treatment without fertilizer. The 15 treatments were randomly distributed in the field in an arrangement of complete blocks with six replications. The cane (Saccharum officinarum L.) was harvested 18 and 12 months after planting for the plant and ratoon cycles, respectively. The highest calculated cane yields (164, 134, and 110 Mg ha⁻¹) were obtained with the fertilization rates 170-90-100, 170-85-85, and 190-100-100, selected from the regression models generated in the three cultivation cycles, since higher N, P, and K rates reduced cane yields, suggesting that the fertilizer rate presently used in the area (120-60-60) is insufficient to satisfy the sugar cane crop nutrient requirements. Cane yields diminished according to the cultivation cycles. The fertilization rates did not modify the Brix degrees, purity, sucrose and humidity percentages, indicating that the optimal economic fertilization rates allow cane yield increases without diminishing the juice quality. After five years of sugar cane cultivation, the Vertisol did not show significant changes in its chemical properties; only an unbalance in the Ca/Mg relationship was observed; therefore, it is recommended that gypsum be applied, to avoid possible antagonisms in the absorption of K and Mg.

Keywords

Saccharum officinarum, crop yield, juice quality, nitrogen, phosphorus, potassium.