

## ABSTRACT

### **Stalk yield and nitrogen exports after nitrogen fertilization of two ratoons of sugarcane**

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In order to produce sugarcane biomass an adequate supply of nitrogen is important. However, excess N fertilizer may jeopardize the environmental balance of bioenergy derived from sugarcane. Aiming assess the balance of N inputs from mineral fertilizer and outputs by stalk export during two consecutive sugarcane ratoons, a field experiment was established in 2007 (variety IAC 92-1099). After the plant cane cycle (40 kg/ha N applied and 213 t/ha of fresh stalk yield), four rates of nitrogen were applied on ratoons in 2008 and 2009: 0, 60, 120, and 180 kg ha<sup>-1</sup> (ammonium nitrate), in a randomized complete block design, four replications. Stalk yield, N uptake and N export were evaluated. Average stalk yield were 131 t ha<sup>-1</sup> in 2009 and 106 t ha<sup>-1</sup> in 2010. Nitrogen applied to the ratoons caused a linear increase of 150 and 180 kg of stalks ha<sup>-1</sup> for each kg of N applied in the 2009 and 2010, respectively. Considering the two ratoons, the N exported with the stalk was 144, 166, 175 and 207 kg ha<sup>-1</sup> for the cumulative rates of 0, 120, 240 and 360 kg ha<sup>-1</sup>, respectively. Only in the higher rates, the amounts of N applied as fertilizer exceeded those removed with the harvested sugarcane. Literature data show that fertilizer N use efficiency rarely exceeds 40%. Because in Brazil its common the recommendation of 90-120 kg ha<sup>-1</sup> of N for sugarcane ratoons, it is possible that negative balances of N occur in many situations, which may cause soil degradation in the long term, unless other N inputs exist in the system. Therefore studies are necessary to assess long-term effect of fertilizer management on yield and quality of sugarcane and its impact on soil fertility. This study will continue for at least two more cycles in order to address these questions.

**Key words:** Residual effect; Nitrogen balance; *Saccharum officinarum* L.

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