

## **N<sub>2</sub>O Emission from Nitrogen Fertilization in Sugarcane**

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Reduction of greenhouse gases emission is an important reason for the production of first generation ethanol from sugarcane. However the environmental efficiency of ethanol has been questioned on the ground of the emissions of nitrous oxide during crop production. This study aimed at evaluating N-N<sub>2</sub>O from the soil emissions during the cane plant cycle as a function of nitrogen fertilization and inoculation with diazotrophic bacteria (IN) in two sites: Jaú (sandy loam soil) and Piracicaba (clay soil). Gas fluxes were measured by static chambers in the treatments with the following N rates in kg ha<sup>-1</sup>: 0 (control); 0+IN; 60; 60+IN, and 90 kg. The N fertilizer was incorporated into the planting furrow. Emission of N-N<sub>2</sub>O started to be affected by N fertilization after the 16<sup>th</sup> day in Jaú and the 20<sup>th</sup> day in Piracicaba, although in the latter site N-N<sub>2</sub>O fluxes increased in all treatments after the 12<sup>th</sup> day due to rain and irrigation. In approximately 300 days of evaluation, N-N<sub>2</sub>O fluxes ranged from 37 to 3840 µg N m<sup>-2</sup> day<sup>-1</sup> in Piracicaba and from 19 to 5141 µg N m<sup>-2</sup> day<sup>-1</sup> in Jaú. In Jaú the peak emission for the period of assessment was 4076 µg N m<sup>-2</sup> day<sup>-1</sup> on the average of the treatments that received N fertilization. Despite the decline in emissions after the initial phase, higher emissions in the application of 90 kg N ha<sup>-1</sup> in Piracicaba were found up to 200 days. The emission of inoculated plots did not differ from that observed in control plots in both sites. N-N<sub>2</sub>O fluxes in the line were related with N-NO<sub>3</sub><sup>-</sup> level and C-CO<sub>2</sub> fluxes in both sites. The percentage of fertilizer N emitted as N-N<sub>2</sub>O until the 20<sup>th</sup> day was 0.13% and 0.36% for Piracicaba and Jaú, respectively.

Supported by “FAPESP, CNPq”

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