MANAGING GLOBAL RESOURCES FOR A SECURE FUTURE

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Ammonia Emissions from N-Fertilization of Maize and Common Bean Grown in a Brazilian Cerrado Oxisol.

Poster Number: 108654

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Maria da Conceição Santana Carvalho. Embrapa Arroz e Feijão, EMBRAPA - Empresa Brasileira de Pesquisa Agropecuária, Santo Antônio de Goiás, ..., BRAZIL, Nelson Horowitz, Yara Brasil Fertilizantes SA, Porto Alegre, Brazil and Adriano Stephan Nascent, Goleas State, Embrapa Arroz e Feijão, Santo Antonio de Goiás, BRAZIL

Abstract:

The Cerrado region is responsible for more than 50% of maize (Zea mays L.) and common bean (Phaseolus vulgaris L.) produced in Brazil. These crops are large consumers of synthetic N-fertilizers in Brazil, which is an agricultural practice of growing environmental concern as one important source of Greenhouse Gas Emissions. During three growing seasons, we quantified NH₃ emissions from three fertilizers applied on maize and on common bean grown in a clayey Oxisol in the State of Goiás, Brazil. The fertilizers evaluated were calcium ammonium nitrate - CAN, urea, and ammonium sulfate. The rates of N applied were 150 kg ha⁻¹ (maize in 2013/14 growing season), 100 kg ha⁻¹ (maize in 2014/15 and 2015/16 growing season), and 80 kg ha⁻¹ (common bean in 2015/16 growing season). We also evaluated NH₃ emissions from a control treatment, without N application. The treatments were arranged in a randomized block design with five replications. Urea presented the higher NH₃-N emissions in all growing seasons. In 2013/14 growing season, the cumulative N loss as NH₃ volatilized from urea was 7.11%, which was higher than ammonium sulfate (2.4%) and CAN (0.9%). In 2014/15 growing season, the cumulative N loss by NH₃ volatilization was estimated at 30%, while the NH₃-N loss from CAN and ammonium sulphate were 2.4% and 2.6%, respectively. In 2015/16 growing season, the NH₃-N loss from urea corresponded to 9.5% of N applied for maize and to 3.4% for common bean, while for the other two fertilizers NH₃-N losses were lower than 0.7%. The NH₃ volatilization occurred from one to eight days after fertilizers application, although the main losses occur in the first three or four days. There was no difference among the fertilizers in agronomic evaluations, except for the apparent N recovery, which was a little lower for urea.

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