

Soil gaseous N_2O emission in integrated crop-livestock systems under different grazing intensities

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Integrated crop-livestock systems (ICLS) are gaining increased attention due to the potential for mitigating and global warming. Several studies showed that ICLS besides diversifying agricultural production have the potential to contribute to reducing emissions of greenhouse gases (GHG) such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) per unit of agricultural product. In addition, comparisons between paired grazed-ungrazed plots have been widely used and showed that the grazing animal have directly and indirectly impacts on GHG emissions. Thus, the objective of this study was to understand the relationship between pasture management in ICLS on GHG emissions. The data collection was conducted in a long term protocol (stablished in 2001) at Southern Brazil. The ICLS model was based on soybean (*Glycine max)* as summer crop in rotation with cool season mixed pasture-common oats (*Avena strigosa*) plus annual ryegrass (*Lolium multiflorum*). The grazing phase was continuously stocked with Angus X Hereford steers with four treatments based on target sward surface heights (10, 20, 30, and 40 cm). A set of three aluminum chambers (80 cm long x 30 cm high and 40 cm wide) was used for each experimental unit. Soil emissions were assessed 10 times in 2013/2014 and 15 times in 2014/2015. The effects of sward heights on soil emissions of greenhouse gases was evaluated during both phases of the ICLS (summer crop and winter pastures). The results shown that the treatments with moderate grazing intensity (20 and 30 cm) presented lowest values of N_2O emission. Results support that differences between grazing treatments and ungrazed plots could be related to the improvement of the physical and biological properties of the soil reducing those emissions.

Keywords: Integrated crop-livestock systems, global warming mitigation, no tillage, static chamber