

## Greenhouse Gases Balance of Pasture-Based Dairy Production Systems in Brazilian Atlantic Forest Biome

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Brazilian cattle production is mostly carried out in pastures and the need to reduce the sector's greenhouse gas (GHG) emissions and its overall environmental footprint has become a priority. The adoption of well-suited breeds and intensification of pasture-based livestock production systems are an alternative to optimize the sector's land usage, through the reduction of deforestation and mitigation of environmental impacts. However, further research on tropical systems is necessary. The objective of this research was to evaluate the effect of Holstein and Jersey-Holstein crossbred cows in different levels of pastures intensification (continuous grazing system with low stocking rate–CLS; irrigated rotational grazing system with high stocking rate–RHS), and the interaction between these two factors on the GHG mitigation. Twenty-four Holstein and 24 Jersey-Holstein crossbred dairy cows were used to evaluate the effect of two grazing systems on milk production and composition, soil GHG emissions, methane emission, soil carbon accumulation (0-100 cm). These variables were used to calculate the carbon balance, GHG emission intensity and land-saving effect. The carbon balance of all systems and genotypes presented a deficit in carbon; there was no difference for genotypes, but RHS was more deficient than CLS (-4.99 to CLS and -28.72 to RHS ton CO<sub>2e</sub>/ha.year). Likewise, the GHG emission intensity was similar between genotypes and higher for RHS (-0.480 to RHS and -0.299 to CLS kg CO<sub>2e</sub>/kg FCPCmilk). Although both GHG removals (0.14 to CLS higher than 0.02 to RHS kg CO<sub>2e</sub>/kg FCPCmilk) and GHG emissions (-0.49 to RHS higher than -0.44 to CLS kg CO<sub>2e</sub>/kg FCPCmilk) contributed to results in the GHG emission intensity of milk production, the greatest influence was due to the lower removals of GHG from RHS. In contrast, the grazing intensification resulted in higher milk production and land-saving effect of 2.7 ha for each ha of intensified pasture.

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