

EGU23-7883, updated on 28 Feb 2024

<https://doi.org/10.5194/egusphere-egu23-7883>

EGU General Assembly 2023

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## Effects of different slurry application techniques on Nitrogen Use Efficiency (NUE) in an extensive grassland

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Optimized slurry management targeted to increase nitrogen use efficiency (NUE) can be fundamental for limiting fertilizer N losses from agricultural grasslands causing eutrophication of ground- and surface water as well as air pollution. However, a holistic assessment of both agronomic and environmental impacts including key soil functions is still missing. This study aims to provide such information by assessing the impacts of traditional vs. modern slurry application techniques on NUE, hydrological and gaseous N losses, productivity and fodder quality, soil organic nitrogen formation and total N balances. In a plot-scale grassland experiment <sup>15</sup>N enriched slurry was applied after the first cut in early summer. The application treatments included: (1) traditional slurry broadcast spreading under dry weather; (2) application like (1) followed by a heavy rainfall event to increase slurry infiltration into soil; (3) broadcast spreading of slurry diluted with water; (4) injection of slurry into soil via shallow slits; and (5) injection of slurry into soil via deep slits. Variant (4) and (5) represent modern trailing shoe injections requiring extensive machinery. Fates of fertilizer N such as plant uptake, immobilization in soil and microbial biomass as well as NO<sub>3</sub> leaching were investigated by <sup>15</sup>N tracing approaches in order to create full N balances. For this, biomass harvest and soil sampling were conducted after a growth period of 2 months. Here, we will present first results of our work that are expected to provide highly relevant decision support for grassland management.