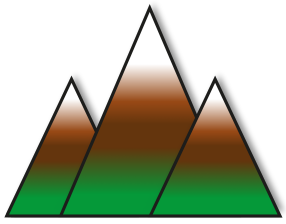

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Internationale Grünland-Konferenz 2025

Contribution ID: **58** Type: **Poster presentation (4:40 PM - 6:30 PM)**

# The fate of fully 15N labelled organic fertilizer under different management intensities in 27 grassland sites across Germany

*Tuesday 15 July 2025 16:40 (1h 50m)*

Fertilization strongly influences nitrogen (N) cycling and balance in managed grasslands. To investigate the long-term dynamics of organic N inputs, we applied fully 15N-labelled manure and slurry to 27 plots across three German regions under three different management intensities. Our findings show that slurry fertilization resulted in faster incorporation of fertilizer N into the plant-soil system and a slightly higher short-term plant uptake in the year of application with 11% (±1.4 SE) of fertilizer N in aboveground biomass for slurry and 1% (±0.3 SE) for manure. However, slurry also led to substantially higher N losses, particularly under intensive application. Unrecovered fertilizer N in intensive management was 47% (±1.8 SE), for medium management it was 20% (±4.9 SE) and for extensive management 11% (±3.9 SE). In contrast, manure under extensive management showed minimal N losses, with most fertilizer N (85% ±3.5 SE) retained in the soil pool. Over time, manure contributed to a more stable N reservoir, as across all treatments plants primarily sourced N from the soil 93%, with only 7% (±1.2 SE) derived directly from the fertilizer. These results highlight the trade-off between immediate N availability and long-term sustainability, emphasizing the role of organic fertilizer type and management intensity in shaping grassland N dynamics.

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**Session Classification:** Poster Session & Get-Together (including Beer & Pretzels)

**Track Classification:** Day 1: Science (English) / Tag 1: Wissenschaft (Englisch): Biogeochemical processes in grassland soils