



Effects of nitrogen and intensive mixing on decomposition of ¹⁴C-labelled maize (*Zea mays* L.) residue in soils of different land use types

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This study investigated the effects of mineral-N addition and intensive mixing (analogous to disturbance by plowing) on decomposition of ¹⁴C-labelled maize (*Zea mays* L.) residue and soil organic matter (SOM). Soils were collected from the upper 5 cm at Edelweiler, located in the Black Forest (Baden-Württemberg, southwest Germany). Three land use types were investigated: plow tillage (PT), reduced tillage (RT) and grassland (GL). Soils were incubated for 112 days at 20 °C, with or without ¹⁴C-labelled maize residue (4 g DM kg⁻¹ soil), with or without nitrogen (100 mg N kg⁻¹ soil as NH₄NO₃) and with or without intensive mixing. The effects of mineral-N on maize residues decomposition differed depending on the stage of decomposition and land use types. Nitrogen accelerated residue decomposition rates in the first 5 days in RT and GL soils, but not in PT soil, and decreased residues decomposition rates in all the three land use types after 11 days. At the end of the incubation, N suppressed ¹⁴CO₂ efflux in RT and PT soils, but not in GL soil, and the magnitude of the N effects ranked in the order: RT>PT>GL. Mineral-N did not increase SOM decomposition in all land use types. Intensive mixing stimulated decomposition rates of both plant residues and SOM in all the three land use types. However, the mixing effects were smaller in GL soil than in RT or PT soil, because stronger soil aggregates in GL. Stronger soil aggregates were less disturbed by mixing and protected better SOM and plant residues against decomposition stimulated by mixing.