



**RegenPGC Graduate
Education Community**

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Assessing the role of perennial groundcovers in mitigating erosion and sediment transport

Abstract Soil erosion and sediment transport from working landscapes pose critical threats to U.S. agriculture, contributing to nutrient export, sedimentation in water bodies, and degrading soil health. This study evaluates the effectiveness of a no-till perennial groundcover (PGC) system using Radix Hybrid *bulbosa* (RHb)— a novel cropping system that enhances ecosystem services— in mitigating erosion and sediment transport in a corn-soybean rotation with spring manure application. The field trials used the mesh-bag method and retrieved detached soil sediments throughout the 2024 growing season to assess erosion rates under RHb groundcover and no-cover treatments.

Results demonstrate that the RHb-based PGC system significantly reduces soil erosion, particularly during the early crop growth stages. Erosion rates in the RHb treatment averaged 2.5 t/ha, compared to 13 t/ha in the no-cover treatment during early season rainfall events. Statistical analysis confirms a significant difference in erosion reduction ($p < 0.01$ on July 1 and September 13), with an average reduction of 81.5% in soil detachment observed in RHb plots. The RHb groundcover also reduced variability in erosion rates and improved sediment retention by stabilizing soil through root systems.

However, seasonal observations suggest diminishing differences in erosion rates between treatments as the growing season progresses and erosion becomes canopy-controlled; this highlights that PGC systems are most effective during high-rainfall, early-growth periods. These results, therefore, provide insights into mitigation strategies for soil erosion and support continued exploration of PGC systems for soil management in agriculture, contributing to the broader efforts of reducing sediment transport to U.S. water bodies. Further optimization of PGC systems may also improve their performance by overcoming limitations related to crop competition.

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