

Irrigated and Rainfed Field Trials to Maximize Biological Nitrogen Fixation: Assessing the Legacy Impact of Soybean and Peas on Residual Soil Nitrogen and Yield of Cereal and Oilseed Crops

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Soybean and field pea are important nitrogen fixing grain legumes in Manitoba crop rotations. Beyond the direct benefit of inoculating soybean and pea to meet plant nitrogen demands in the year of production, apparent nitrogen credits from legume residues or altered soil nitrogen dynamics that follow soybean or pea can be characterized and quantified to reduce nitrogen fertilizer rates applied to succeeding crops. The current project was established in 2024 to assess how rainfed versus irrigated soybean and pea production systems can be managed to generate a step-wise gradient in crop yield potential and biological nitrogen fixation. Over a three year time frame, field research sites at Warren, MB and Carberry, MB will be monitored to assess how changes in soybean and pea yield potential influence residual soil nitrogen levels and the fertilizer replacement value (FRV) of legume residues to wheat (2025) and canola (2026) crops that follow. A preliminary overview of yield results and residual fall soil nitrogen levels from the 2024 season are reported. Processing whole plant samples for nutrient content and monitoring soil nitrogen status will occur prior to research sites being sown to wheat in the 2025 growing season.