

Establishing Alfalfa & Sainfoin Through Intercropping with Sunflower

Marisol Berti, North Dakota State University

Franklin Omeje, North Dakota State University

Haley Mosqueda, North Dakota State University

Anastasia Kurth, North Dakota State University

Houston Lindell, North Dakota State University

Escalating soil health, food security and environmental challenges necessitate sustainable agricultural practices. Economic, environmental, and biological pressures underscore the need for innovative farming methods. Intercropping, especially combining alfalfa (*Medicago sativa* L.) and sainfoin (*Onobrychis viciifolia* Scop.) with sunflower (*Helianthus annuus* L.), emerges as a promising strategy to enhance the acreage and profitability of these crops. The present study was undertaken to explore the feasibility of establishing alfalfa and sainfoin through intercropping with sunflower, by comparing this method with the conventional cultivation of alfalfa or sainfoin and sunflower grown independently. The implications on cash crop yield offset and the yield of seeded alfalfa or sainfoin in the second year were also investigated. Conducted from May 2023 to 2024 in Hickson and Prosper, ND, USA, the study employed a randomized complete block design with four replicates. The treatments included (1) alfalfa alone, (2) alfalfa intercropped with sunflower at 40 kg N/ha, (3) alfalfa intercropped with sunflower at 80 kg N/ha, (4) sainfoin alone, (5) sainfoin intercropped with sunflower at 40 kg N/ha, (6) sainfoin intercropped with sunflower at 80 kg N/ha, and (7) sunflower alone. The results indicated that intercropping alfalfa with sunflower did not significantly affect the overall grain yields (avg grain yield was 2302 kg/ha) of sunflower or forage, and nutritive value of alfalfa, whereas sainfoin intercropping showed a reduction in forage yields. A notable increase in beneficial insect populations within the plots intercropped with alfalfa and sainfoin was observed, suggesting that these intercrops enhance biodiversity. In the upper Midwest, intercropping alfalfa with sunflowers emerges as a promising system to produce alfalfa while concurrently yielding sunflowers during their establishment year.