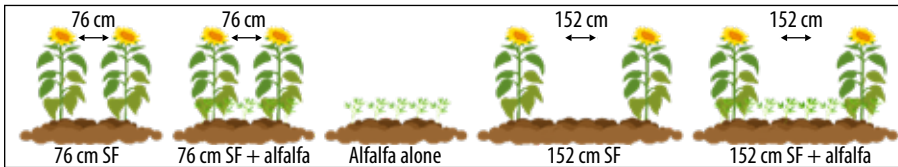


NORTH DAKOTA– Establishing Alfalfa While Growing Sunflower

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In an effort to increase the number of acres of alfalfa in the Upper Midwest, we are studying diverse ways to establish alfalfa in the midst of growing another cash crop, which comes with the added benefit of skipping the typically lower-yielding seeding year of alfalfa. The objectives of this study were to: a) determine if intercropping alfalfa with different sunflower row spacings is a viable option for establishing alfalfa compared to traditional spring-seeded alfalfa; b) determine if sunflower yield is affected by intercropping with alfalfa at 30" (76 cm) and 60" (152 cm) row spacings; and c) evaluate the economics of establishing alfalfa in a sunflower-alfalfa intercropping system compared to traditional spring-seeded alfalfa alone. This is an ongoing research project. Therefore, only results from the establishment year are presented here.



Oilseed hybrid sunflower and alfalfa were seeded in a randomized complete block design on May 12, 2021, at Hickson and Prosper, ND. Sunflower seed yield, alfalfa forage yield, soil nitrate, photosynthetically active radiation (PAR interception), and other parameters were evaluated in Year 1. Alfalfa biomass yield was determined using two cuttings from alfalfa alone and in between sunflower row treatments. Statistical analysis was performed with Proc Mixed of SAS at significance level of $P \leq 0.05$.

Significant treatment by date interaction for PAR interception was due to alfalfa alone having a lower light interception (Figure 1). Alfalfa intercropped with sunflower at different row spacings did not significantly impact sunflower seed yield in 2021 (Figure 2). Gravimetric soil water was lower where alfalfa and sunflower were intercropped and decreased as the growing season progressed (Figure 3). No significant difference between treatments for nitrate-nitrogen reduction was observed (data not shown). In-row alfalfa biomass and quality were not significantly different for row spacings (data not shown).

Figure 1. Date x treatment interaction for PAR interception of alfalfa only and sunflower (SF) alfalfa intercropping treatments combined across Hickson and Prosper, ND, in 2021. 30" row spacing (76 cm), 60" row spacing (152 cm).

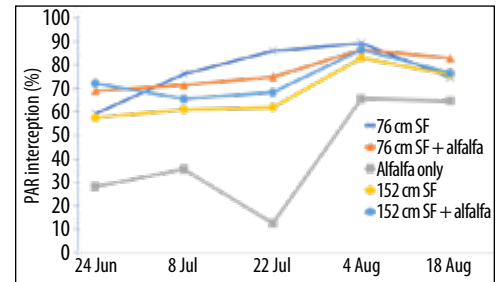


Figure 2. Sunflower seed yield due to alfalfa or sunflower (SF) row spacing combined across Hickson and Prosper, ND, in 2021.

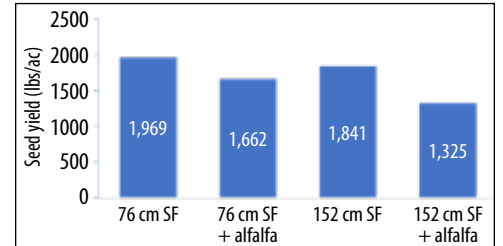


Figure 3. Date by treatment interaction for gravimetric soil water at five dates where alfalfa and sunflower (SF) were intercropped in Hickson in 2021. Conversion 20% water = 200 g kg⁻¹.

