Extending the grazing season with intercropping summer annuals and cover crops

Shelby Gruss, assistant professor | Lauren Jaschke, research associate | Department of Agronomy | Ken Pecinovsky, farm superintendent

Introduction

Grazing is the most cost-effective method of harvesting forage, so extending grazing into late fall and early spring can significantly reduce feed costs for livestock operations. Summer annuals are commonly used to combat the "summer slump" because they grow quickly, perform well in multi-cut systems, and thrive in summer heat when cool-season grasses slow down. Meanwhile, interest in cover crops is increasing as a strategy to provide additional grazing opportunities in fall or early spring. However, in the upper Midwest, the establishment window for cover crops after traditional silage or grain harvest is often very short, limiting success. This project evaluates whether cover crops can be successfully established within a multi-cut summer annual system to improve forage availability and reduce feed costs.

Materials and Methods

Trials were conducted in summer 2024 and 2025 at two Iowa State Research Farms (AEA and NERF). Treatments included two summer annual species, two cover crop planting dates, and two cover crop mixes in 2024 at both locations (Table 1). An additional planting date was included at AEA in 2025. The cover crop seeding rate was increased in 2025, and oats were added to the mix (Table 1). Yield potential and nutritive value were evaluated during three timeframes: summer, late fall, and early spring; periods when cool-season forage production is typically limited. At each timeframe, we collected yield (tons/acre), nutritive value (not shown), and species composition (AEA location only). Late fall yield at AEA was analyzed separately for summer annuals and cover crops to assess their contribution to total yield. Finally, total yield was calculated.

Results and Discussion

Summer: Summer annuals and cutting was the only significant effect. Sorghum x sudangrass outyielded pearl millet in the second cutting at the AEA farm in 2024 and in the first cutting at NERF in 2024. In 2025 sorghum x sudangrass outyielded pearl millet at both locations for both cuttings, averaging greater than 1 ton per acre more.

Fall: The total yield was impacted by the summer annual treatment in 2024. At the AEA location pearl millet outyielded the sorghum x sudangrass treatment, but the opposite occurred at NERF. In 2025 a similar pattern was noted. NERF had higher yields for the sorghum x sudangrass treatment while at AEA, pearl millet treatment typically outyielded the sorghum x sudangrass treatment. AEA has numbers for the how much the cover crops contributed to yield, and earlier planted cover crops with pearl millet typically outyielded the other treatments. Cover crops intercropped with pearl millet generally outyielded the cover crops intercropped with sorghum x sudangrass. The intercropped cover crops at AEA did not add much biomass to the fall yield. While at NERF seemed to have a higher contribution (visual observation).

Spring: AEA did not have any significant impact due to treatments. While at NERF there was a significant impact due to summer annual treatment. Pearl millet treatment had higher yields, 2.5 tons per acre, while sorghum x sudangrass yielded 1.9 tons per acre. Integrating cover crops into a multi-cut summer annual system shows promise for extending grazing opportunities and improving forage availability in the upper Midwest. While summer annual species strongly influenced yield, cover crop contributions varied by location and planting date. Further research should refine seeding strategies and management practices to optimize system performance under variable weather conditions.

Acknowledgements

We would like to thank Roger Hintz and Patrick Galland for help with field preparation, management and data collection. We would like to thank S&W Seed Company for donating seed.

Table 1: Summary of treatments and abbreviations.

Year	Locations	Summer Annual (SA)		Cover Crops (CC)		Planting CC Timeframe			Harvest Dates
2024	NERF	Pearl millet (PM	Sorghum Sudangrass (SxS)	Cereal Rye + Crimson Clover	Cereal Rye + Berseem Clover	Following 1st SA harvest	Following 2nd SA harvest	N/A	SA: August, September and Early November CC: November and following May
	AEA								
2025	NERF			same as 2024 + oats	same as 2024 + oats	Following 1st SA harvest	Following 2nd SA harvest	N/A	
	AEA							Following 2nd harvest + SA terminated	

Table 2: Yield at the AEA farm for 2024 and 2025. Comparisons are made within season and cutting or contributing species if applicable. Letters indicate significance (P<0.05).

			Summer Yield		Fall Yield			Spring Yield
			Tons per acre					
Year	Treatment	Planting	1st cut	2nd cut	Summer Annual	CC	Total	Total
2024	Pearl Millet	-	1.2 b	1.1 b	0.45 a	0.20 a	0.7 a	1.4
	Sorghum x Sudangrass	-	1.3 b	2.2 a	0.50 a	0.16 a	0.6 b	
2025	Pearl Millet	1	3.0 b	0.4 d	0.5 a	0.53 a	1.1 a	TBD
		2			0.5 a	0.12 b	0.6 b	
		3			0.0 b	0.17 b	0.2 c	
	Sorghum x Sudangrass	1	4.7 a	1.2 c	0.6 a	0.13 b	0.6 b	
		2			0.6 a	0.05 b	0.6 b	
		3			0.6 a	0.05 b	0.7 b	

Table 3:Table 2: Yield at then NERF for 2024 and 2025. Comparisons are made within season and/or cutting if applicable. Letters indicate significance (P<0.05).

		Summer		Fall	Spring
		Tons per acre			
Year	Treatment	1st cut	2nd cut	Total	Total
2024	Pearl Millet	1.2 c	1.7 b	0.7 b	2.5 a
	Sorghum x Sudangrass	2.6 a	1.6 b	0.9 a	1.9 b
2025	Pearl Millet	2.4 b	0.8 d	1.6 b	TBD
	Sorghum x Sudangrass	5.5 a	1.7 c	3.6 a	