Adding Annual Forages into Southern Iowa Farm Enterprises

RFR-A20100

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Introduction

Decreased forage acres across Iowa have left cattlemen with the challenge of optimizing existing resources without compromising productivity of the land and cow herd. One solution is incorporating annual forages into the farming operation. However, many questions remain regarding species selection and application on the farm level. The objective of this demonstration project is to compare feed value and yield potential of various cool- and warm-season annual forages.

Materials and Methods

Five species of cool-season annual forages (barley, cereal rye, forage wheat, winter wheat, and triticale) were planted in early October 2019. The species were selected based on their ability to overwinter, with the exception of barley, which was selected to determine if it would overwinter. For the warm-season species, crabgrass, Japanese millet, Pearl millet, sorghum sudangrass, and teff were selected based on their ability to be a multi-cut species throughout the summer months.

For both cool- and warm-season species, individual species were seeded into 1,050 sq ft forage plots at the Armstrong Research Farm, Lewis, Iowa, and the Neely-Kinyon Research Farm, Greenfield, Iowa. Eight replicates of each species were seeded with half of the plots receiving 0 lb of Nitrogen (N) fertilization per acre early in the growing season and half receiving 50 lb of N/acre. For cool-season species, forage samples were taken at random throughout individual plots and compiled for nutrient analysis based on species and N treatment. At this time, yield data also was collected on individual plots and compiled for final species yield data. For warm-season species, forage samples were taken to determine nutrition analysis and yield estimates were collected at two timepoints throughout the summer months. The target for harvesting was before forage plots reached the reproductive stage, mimicking when forages would be grazed and optimizing yield potential without hindering feed quality.

Results and Discussion

Forage yields of the cool- and warm-season species are found in Table 1. At both farms, the barley plots did not overwinter well, so based on limited plants, forage was not sampled for yield estimates. Cereal rye resulted in greatest yield, and although lower in tonnage than cereal rye, forage wheat, winter wheat, and triticale yield were comparable. For warm seasons, drought conditions throughout the summer months limited yield potential, and forages were only harvested twice. Although variable across farms, Pearl millet and sorghum sudangrass appeared to be the most drought-tolerant species. For both cool- and warm-season annuals, N application resulted in an approximately 25–50 percent yield boost, demonstrating if producers are using annual forages as a forage source, fertilization is advantageous.

Annual forages can be a high-quality forage source. Table 2 provides a forage quality summary for the 2020 growing season of individual forage species. For spring-calving cows, nutritional requirements are highest 45–60 days post calving, which often aligns with

the timeframe of grazing cool-season annuals. In general, these cool-season annuals are sufficient to meet late gestation and early lactation requirements. Additionally, the warm season annuals are often grazed or harvested before the reproductive stage and, therefore, are of high nutrient value, exceeding requirements of beef cows.

Conclusions

Annual forages are a high-quality forage resource that can be a valuable addition to the cow herd. Cool-season annuals often provide forage availability before cool-season pastures have ample growth to support beef cows, and warm-season annuals can provide relief to those same pastures during the dormant summer months.

Acknowledgements

This project was funded by the Iowa Nutrient Research Center and the Southern Iowa Forage and Livestock Committee. Additionally, the authors wish to thank Millborn Seeds and Barenbrug USA for seed donation, additional extension beef and agronomy specialists involved in the project, and the farm staff.

Table 1. Forage yield of various annuals (ton/acre on a dry matter basis).[a]

	ARF		NKRF	
	0 N	**50 N**	**0 N**	**50 N**
Cool-season annuals[b]				
Barley	-	-	-	-
Cereal rye	0.89	1.12	1.73	2.67
Forage wheat	0.47	0.87	1.58	2.03
Winter wheat	0.59	0.82	1.89	1.82
Triticale	0.50	0.83	1.57	1.87
Warm-season annuals[c]				
Crabgrass	1.53	2.38	1.40	1.36
Japanese millet	1.52	2.31	1.74	1.64
Pearl millet	2.66	3.07	2.53	3.37
Sorghum sudangrass	2.51	2.91	1.69	2.23
Teff	1.27	1.94	2.15	2.32

[a]ARF = Armstrong Research Farm; NKRF = Neely-Kinyon Research Farm; 0 N = 0 lb of nitrogen applied; 50 N = 50 lb of nitrogen applied.
[b]Drilled 10/18/19 and harvested 5/18/20 and 5/19/20 at the ARF and NKRF, respectively.
[c]Drilled 6/4/20 and harvested 9/14/20.

Table 2. Forage nutrient analysis of various annuals.[a]

	DM, %	CP, %	ADF, %	NDF, %	TDN, %
Cool-season annuals					
Barley	16.6	26.3	25.0	37.9	69.4
Cereal rye	16.5	13.6	32.6	51.3	63.5
Forage wheat	18.8	14.6	32.3	48.0	63.8
Winter wheat	19.5	13.3	31.9	45.8	66.2
Triticale	18.1	13.5	29.1	48.1	64.0
Warm-season annuals					
Crabgrass	35.8	10.3	38.4	58.5	59.0
Japanese millet	40.9	12.9	36.1	54.4	60.8
Pearl millet	29.3	14.4	37.2	53.7	59.9
Sorghums sudangrass	24.1	10.6	37.8	55.5	62.6
Teff	52.3	10.9	36.9	60.2	60.2

[a]DM = dry matter; CP = crude protein; ADF = acid detergent fiber; NDF = neutral detergent fiber; TDN = total digestible nutrients.