

# 2025 Summer Annual Forage Variety Trial



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Warm season grasses, such as sudangrass, and millet can provide quality forage in the hot summer months, when cool season grasses enter dormancy and decline in productivity. The addition of summer annuals into a rotation can provide a harvest of high-quality forage for stored feed or grazing during this critical time. Generally, summer annuals germinate quickly, grow rapidly, are drought resistant, and have high productivity and flexibility in utilization. The UVM Extension Northwest Crops and Soils Program conducted this variety trial to evaluate the yield and quality of warm season annual forage grasses.

### MATERIALS AND METHODS

A trial was initiated at Borderview Research Farm in Alburgh, VT on 18-Jun (Table 1). Plots were seeded with a Great Plains cone seeder (6" row spacing) at a seeding rate of 625,000 seeds ac<sup>-1</sup> for the sorghum x sudangrass crosses and pearl millets, 675,000 seeds ac<sup>-1</sup> for the sudangrasses, and 325,000 seeds ac<sup>-1</sup> for the forage sorghums. Mixtures were seeded according to the recommended rate in lbs ac<sup>-1</sup> on their tags. Thirty varieties of these species were compared, each replicated three times (Table 2).

**Table 1. Trial management, 2025.**

<b>Trial Information</b>	<b>Borderview Research Farm-Alburgh, VT</b>
Soil Type	Benson rocky silt loam
Previous crop	Corn silage
Topdress fertilizer	50 lbs ac <sup>-1</sup> 46-0-0, 29-Jul
Planting date	18-Jun
First harvest date(s)	21-Jul 28-Jul (millets)
Second harvest date	3-Sep
Seeding rates: Sudangrass	675,000 seeds ac <sup>-1</sup>
Sorghum x sudangrass and pearl millet	625,000 seeds ac <sup>-1</sup>
Forage sorghum	325,000 seeds ac <sup>-1</sup>
Tillage methods	Pottinger TerraDisc

†H = hybrid; OP = open pollinated.

Prior to each harvest, forage height was measured in each plot. Plots were not harvested until they reached at least 18" in height. Plots were harvested on 21-Jul for sudangrass, sorghum sudangrass, sorghum, and mixture treatments, 28-Jul for millet treatments, and all treatments again on 3-Sep. Plots were harvested using a Carter small plot flail forage harvester equipped with scales. The material within a 3' x 20' swath in each plot was harvested to a height of approximately 4" and weighed. An approximate 1 lb subsample was collected from each plot and dried to determine dry matter content and calculate dry matter yields. The samples were then ground to 2mm using a Wiley mill and to 1mm using a UDY cyclone mill. Samples were analyzed for forage quality at the E. E. Cummings Crop Testing Laboratory at the University of Vermont (Burlington, VT) via near infrared reflectance spectroscopy (NIR) techniques using a FOSS DS2500 Feed and Forage Analyzer.

**Table 2. Summer annual forage varieties and characteristics, 2025.**

Species	Variety	Characteristics
Pearl millet	Epic	BMR
	Leafy T	none
	Prime 180	none
	Prime 360	none
	Tifleaf III	BMR
Mixtures	Ray's Crazy Summer Mix	none
	YieldMax Mix	none
Forage sorghum	FiberPro 50	none
	FiberPro 72	none
	Viking 404	BMR, male sterile
Sorghum sudangrass	AS 6401	none
	AS 6501	none
	Blue River 225	BMR, Juicy stalk
	Eons	none
	FSG 214	none
	KF 150	none
	KF 185	none
	RapidPro 64	none
	RapidPro 77	none
	Sugar Pro 55	none
	Viking 104	Male Sterile
	Viking 204	BMR, Dry stalk
	Viking 234	BMR, Dwarf
Viking 304	BMR, Photoperiod sensitive	
Sudangrass	AS 9301	none
	EnergyPro 93	none
	<i>Experimental line</i>	none- not commercially available
	KF 200	none
	Piper	none
	Viking 510	BMR

Mixtures of true proteins, composed of amino acids, and non-protein nitrogen make up the crude protein (CP) content of forages. The bulky characteristics of forage come from fiber. Forage feeding values are negatively associated with fiber since the less digestible portions of the plant are contained in the fiber fraction. The detergent fiber analysis system separates forages into two parts: cell contents, which include sugars, starches, proteins, non-protein nitrogen, fats and other highly digestible compounds; and the less digestible components found in the fiber fraction. The total fiber content of forage is contained in the neutral detergent fiber (NDF) which includes cellulose, hemicellulose, and lignin. This measure indicates the bulky characteristic of the forage and therefore is negatively correlated with animal dry matter intake. The portion of the NDF fraction that is estimated to be digestible after 30 hours of fermentation in rumen fluid is represented by the 30- hour NDF digestibility. Ethanol soluble carbohydrates (ESC) are simple sugars found in grasses. Water soluble carbohydrates (WSC) include sugar-like compounds called fructans found in grasses. Several quality metrics are combined to predict milk yield per ton of forage.

Data were analyzed using a general linear model procedure of SAS (SAS Institute, 1999). Replications were treated as random effects, and treatments were treated as fixed. Mean comparisons were made using the Least Significant Difference (LSD) procedure where the F-test was considered significant, at  $p < 0.10$ . Variations in genetics, soil, weather, and other growing conditions can result in variations in yield and quality. Statistical analysis makes it possible to determine whether a difference between treatments is significant or whether it is due to natural variations in the plant or field. At the bottom of each table, an LSD value is presented for each variable (i.e. yield). Least Significant Differences (LSDs) at the 0.10 level of significance are shown. This means that when the difference between two varieties within a column is equal to or greater to the LSD value for the column, there is a real difference between the varieties 90% of the time. In the example to the right, variety C was significantly different from variety A, but not from variety B. The difference between C and B is 1.5, which is less than the LSD value of 2.0 and so these varieties were not significantly different in yield. The difference between C and A is equal to 3.0, which is greater than the LSD value of 2.0. This means that the yields of these varieties were significantly different from one another.

Variety	Yield
A	6.0b
B	7.5ab
C	<b>9.0a</b>
LSD	2.0

## RESULTS

Weather data were recorded with a Davis Instruments Vantage Pro2 weather station, equipped with a WeatherLink data logger at Borderview Research Farm in Alburgh, VT. Temperature, precipitation, and accumulation of Growing Degree Days (GDDs) are summarized for 2025 growing season (Table 3). Following a wet spring, conditions at establishment of this trial were drier than normal. Several small rain events following planting and warm temperatures allowed for rapid emergence and establishment. Throughout the season, conditions continued to be dry with moderate to severe drought conditions developing across the region through late July and August. Overall, through the trial period, precipitation was 4.22 inches below normal and a total of 1,834 GDDs accumulated which was 26 below normal.

**Table 1. Seasonal weather data collected in Alburgh, VT, 2025.**

Alburgh, VT	June	July	August
Average temperature (°F)	67.8	73.2	69.0
Departure from normal	0.35	0.82	-1.67
Precipitation (inches)	2.38	3.76	1.50
Departure from normal	-1.88	-0.30	-2.04
Growing Degree Days (base 50°F)	545	706	583
Departure from normal	21	12	-59

Based on weather data from a Davis Instruments Vantage Pro2 with WeatherLink data logger. Historical averages are for 30 years of NOAA data (1991-2020) from Burlington, VT.

Despite drought conditions through much of the season, the summer annual forage species in the trial displayed their drought and heat tolerance, producing two harvests as is typical for this region. Heights of each variety measured just prior to each harvest are summarized in Table 4. Harvest was timed so that each plot was at least approximately 18" (45.7 cm) in height.

**Table 4. Average height at each harvest for all varieties, 2025.**

Species	Variety	Height (cm)	
		1st cut	2nd cut
Pearl millet	Epic	44.0	47.3
	Leafy T	52.3	50.0
	Prime 180	47.0	45.0
	Prime 360	46.3	39.0
	Tifleaf III	47.3	42.7
Mixtures	Ray's Crazy Summer Mix	60.0	64.3
	YieldMax Mix	68.3	60.7
Forage sorghum	FiberPro 50	67.7	57.0
	FiberPro 72	62.0	52.3
	Viking 404	73.3	61.3
Sorghum sudangrass	AS 6401	82.0	63.7
	AS 6501	80.3	66.0
	Blue River 225	88.3	58.7
	Eons	82.3	61.3
	FSG 214	80.3	63.3
	KF 150	85.7	76.0
	KF 185	71.0	65.3
	RapidPro 64	73.7	55.7
	RapidPro 77	84.7	69.3
	Sugar Pro 55	70.7	68.0
	Viking 104	100.3	81.7
	Viking 204	82.7	62.3
Viking 234	69.7	57.0	
Viking 304	65.3	56.0	
Sudangrass	AS 9301	83.7	60.3
	EnergyPro 93	89.7	75.0
	<i>Experimental line</i>	75.0	91.0
	KF 200	63.0	58.3
	Piper	80.0	95.0
	Viking 510	85.7	70.0

***Variety Performance by Species-Pearl Millet***

The five pearl millet varieties included in this trial did not differ significantly in yield or quality metrics or in yield of quality components (Tables 5 and 6). Unfortunately, due to a harvest error, the first cut data was not captured and only the 2<sup>nd</sup> cut yield and quality results are reported for millets. Millets averaged about 1 ton DM ac<sup>-1</sup> at 2<sup>nd</sup> harvest. Protein and fiber contents were moderate averaging 16.5% and 55.6% respectively. Similarly, both WSC and ESC contents were moderate averaging 9.35% and 7.11% respectively. Fiber digestibility was high averaging 73.3%. In total, these contributed to average yields of 0.134 tons ac<sup>-1</sup> protein, 0.091 tons ac<sup>-1</sup> WSC, 0.070 tons ac<sup>-1</sup> ESC, and 0.379 tons ac<sup>-1</sup> digestible fiber. The predicted milk yields averaged 3568 lbs ton<sup>-1</sup> and 6707 lbs ac<sup>-1</sup>.

**Table 5. Dry matter and quality component yields of five varieties of pearl millet, 2025.**

Variety	1st cut	2nd cut	CP	WSC	ESC	Digestible	Predicted
	tons DM ac <sup>-1</sup>		yield	yield	yield	NDF yield	milk yield
			tons ac <sup>-1</sup>				lbs ac <sup>-1</sup>
Epic	not	0.890	0.130	0.084	0.064	0.340	6660
Leafy T	available	1.05	<b>0.156</b>	0.107	<b>0.081</b>	<b>0.423</b>	<b>7680</b>
Prime 180	due to	<b>1.10</b>	0.150	<b>0.110</b>	0.080	0.423	7614
Prime 360	harvest	0.810	0.112	0.075	0.057	0.338	5550
Tifleaf III	error	0.880	0.121	0.082	0.065	0.371	6028
LSD ( $p = 0.10$ ) or $p$ -value†	N/A‡	NS§	NS	NS	NS	NS	NS
Species mean	N/A	0.944	0.134	0.091	0.070	0.379	6707

†Least significant difference at the  $p = 0.10$  level. The top performing treatment is indicated in **bold**.

‡N/A; data not available due to harvest error.

§NS; not statistically significant.

**Table 6. Average forage quality of five varieties of pearl millet at 2<sup>nd</sup> harvest, 2025.**

Variety	CP	NDF	WSC	ESC	30-hr NDF	Predicted
	% of DM				% of NDF	milk yield
					lbs ton <sup>-1</sup>	
Epic	17.4	53.3	<b>9.75</b>	<b>7.45</b>	74.2	<b>3754</b>
Leafy T	16.9	55.6	9.75	7.42	<b>74.7</b>	3625
Prime 180	<b>17.9</b>	<b>54.4</b>	8.85	6.65	73.3	3556
Prime 360	15.3	57.3	9.10	6.87	72.3	3470
Tifleaf III	15.1	57.3	9.28	7.15	71.9	3438
LSD ( $p = 0.10$ )†	NS‡	NS	NS	NS	NS	NS
Species mean	16.5	55.6	9.35	7.11	73.3	3568

†Least significant difference at the  $p = 0.10$  level. The top performing treatment is indicated in **bold**.

‡NS; not statistically significant.

### Mixtures

Two pre-made mixtures were included in the trial. Ray's Crazy Summer Mix is a 7-way mixture that includes cowpeas (62%), BMR sorghum sudangrass (13%), sudangrass (10%), radish (7%), sunflower (5%), and forage brassica (3%). YieldMax Mix is a 5-way mixture that includes sorghum sudangrass (60%), Italian ryegrass (25%), red clover (7%), berseem clover (7%), and forage rape (1%). Although these mixtures differed in their composition, they produced similar dry matter and component yields (Table 7).

**Table 7. Dry matter and quality component yields of two mixtures, 2025.**

Mixture	1st cut	2nd cut	Total	CP	WSC	ESC	Digestible	Predicted
	tons DM ac <sup>-1</sup>		yield	yield	yield	yield	NDF yield	milk yield
			tons ac <sup>-1</sup>				lbs ac <sup>-1</sup>	
Ray's Crazy Summer Mix	0.902	<b>1.44</b>	<b>2.34</b>	<b>0.438</b>	<b>0.239</b>	<b>0.174</b>	0.852	<b>10628</b>
YieldMax Mix	<b>0.923</b>	1.36	2.28	0.396	0.237	0.167	<b>0.872</b>	9581
LSD ( $p = 0.10$ ) or $p$ -value†	NS‡	NS	NS	NS	NS	NS	NS	NS
Species mean	0.913	1.40	2.31	0.417	0.238	0.171	0.862	10104

†Least significant difference at the  $p = 0.10$  level. The top performing treatment is indicated in **bold**.

‡NS; not statistically significant

Dry matter yields averaged 0.913- and 1.40-tons ac<sup>-1</sup> at first and second cuts respectively for a season total of 2.31 tons ac<sup>-1</sup> (Table 7). Although the mixtures differed in their average protein and fiber content (Table 8), yields of protein and other quality components did not differ on a per acre basis. Ray's Crazy Summer Mix, with its high cowpea inclusion, averaged 19.2% protein, which was significantly higher than the 17.8% of the YieldMax Mix. Similarly with lower fibrous grass inclusion in Ray's Crazy Summer Mix, the average fiber content was over 5% lower than YieldMax. Average WSC, ESC, and fiber digestibility content did not differ between the two mixtures and therefore, they also did not differ in yield of these components per acre. Similarly predicted milk yields did not differ between the two mixtures per ton of forage or per acre. It is important to note that there may be additional benefits to including these other species in these mixtures that were not captured in this trial. For example, both these mixtures included cool season species such as brassicas, which may have continued to produce forage beyond the trial period or may provide flexibility in planting and harvest dates. Comparisons between all monoculture and mixture treatments can be found in Table 15 at the end of this report.

**Table 8. Average forage quality of two mixtures across two harvests, 2025.**

Mixture	CP	NDF	WSC	ESC	30-hr NDF digestibility	Predicted milk yield
	% of DM			% of NDF		lbs ton <sup>-1</sup>
Ray's Crazy Summer Mix	<b>19.2</b>	<b>48.0</b>	10.2	<b>7.47</b>	<b>75.5</b>	<b>3733</b>
YieldMax Mix	17.8	53.4	<b>10.5</b>	7.42	72.4	3517
LSD ( $p = 0.10$ )†	0.783	3.33	NS‡	NS	NS	NS
Species mean	18.5	50.7	10.4	7.44	74.0	3625

†Least significant difference at the  $p = 0.10$  level. The top performing treatment is indicated in **bold**.

‡NS; not statistically significant.

### ***Forage Sorghum***

The three forage sorghum varieties included in this trial produced similar dry matter yields at each of the two harvests and across the entire season (Table 9). These species produced on average 1.09- and 1.33-tons DM ac<sup>-1</sup> at first and second harvests respectively for a season total of 2.43 tons ac<sup>-1</sup>. Due to differences in WSC and ESC contents (Table 10) the three sorghum varieties produced significantly different yields of WSC and ESC. The variety Viking 404 had the highest WSC and ESC contents of 11.8% and 8.73% respectively. However, these were statistically the same as the variety FiberPro 72. This trend is also reflected in the yield of WSC and ESC with Viking 404 producing 0.30- and 0.20-tons ac<sup>-1</sup> respectively, but being statistically similar to the variety FiberPro 72. The variety FiberPro 50 had significantly lower sugar content and thus produced significantly less sugars per acre than these other two varieties. The varieties were similar in fiber digestibility and thus yield of digestible fiber. Despite differences in sugar contents and predicted milk yields per ton, predicted milk yields were similar on a per acre basis.

**Table 9. Dry matter and quality component yields of three varieties of forage sorghum, 2025.**

Variety	1st cut	2nd cut	Total yield	CP yield	WSC yield	ESC yield	Digestible NDF yield	Predicted milk yield
	tons DM ac <sup>-1</sup>					tons ac <sup>-1</sup>		lbs ac <sup>-1</sup>
FiberPro 50	1.082	1.20	2.28	0.390	0.212b†	0.155b	0.922	8194
FiberPro 72	0.960	<b>1.52</b>	2.48	<b>0.401</b>	0.277b	0.204a	0.960	<b>10925</b>
Viking 404	<b>1.252</b>	1.28	<b>2.54</b>	0.386	<b>0.300a</b>	<b>0.222a</b>	<b>0.968</b>	9115
LSD (p = 0.10) or p-value‡	NS§	NS	NS	NS	0.053	0.047	NS	NS
Species mean	1.098	1.33	2.43	0.392	0.263	0.194	0.950	9411

†Treatments that share a letter performed statistically similarly to one another. The top performing treatment is indicated in **bold**.

‡Least significant difference at the  $p = 0.10$  level.

§NS; not statistically significant

**Table 10. Average forage quality of three varieties of forage sorghum across two harvests, 2025.**

Variety	CP	NDF	WSC	ESC	30-hr NDF digestibility	Predicted milk yield
	% of DM				% of NDF	lbs ton <sup>-1</sup>
FiberPro 50	<b>17.1</b>	55.8	9.4b†	6.85b	<b>72.8</b>	3398b
FiberPro 72	16.4	<b>53.4</b>	11.6a	8.45a	72.4	<b>3591a</b>
Viking 404	15.2	54.2	<b>11.8a</b>	<b>8.73a</b>	70.7	3544a
LSD (p = 0.10)‡	NS§	NS	1.36	1.10	NS	138
Species mean	16.2	54.4	10.9	8.01	72.0	3511

†Treatments that share a letter performed statistically similarly to one another. The top performing treatment is indicated in **bold**.

‡Least significant difference at the  $p = 0.10$  level.

§NS; not statistically significant.

### ***Sorghum x Sudangrass***

The fourteen sorghum x sudangrass varieties included in this trial produced significantly different yields at first cut and therefore in total across the season despite producing similar yields at second harvest (Table 11). First cut dry matter yields ranged from 1.07 tons ac<sup>-1</sup> to 1.91 tons ac<sup>-1</sup>. The highest yielding variety at first cut was AS 6501, which produced yields statistically similar to all varieties except RapidPro 64, Sugar Pro 55, and Viking 234. Yields at second harvest averaged 1.24 tons ac<sup>-1</sup> leading to a season total average of 2.62 tons ac<sup>-1</sup>. The highest season total yield was produced by RapidPro 77 with 3.26 tons ac<sup>-1</sup>, however, this was statistically similar to AS 6501, Viking 104, AS 6401, and Blue River 225. Average quality of these varieties only differed significantly in terms of ESC content and fiber digestibility (Table 12). Protein content ranged from 15.9% to 18.5% and averaged 16.5% with no statistical differences between varieties. Fiber content varied little averaging 55.1% and did not differ statistically between varieties. Despite WSC contents ranging from 9.37% to 13.0%, variation within varieties likely contributed to no statistical difference. However, ESC content did differ statistically with the highest content of 8.93% being produced by the variety KF 150. This was statistically similar to Blue River 225 and Viking 204. ESC is particularly important for ensiling these forages as it represents the true sugars available to bacteria to optimally ferment the forage. Fiber digestibility was high ranging from 68.4% to 75.2% with the highest digestibility being produced by variety Viking 304. This was statistically similar to all but four varieties. Despite these differences in quality and yield of quality components, predicted milk yields did not vary on a per ton or per acre basis.

**Table 11. Dry matter and quality component yields of fourteen varieties of sorghum x sudangrass, 2025.**

Variety	1st cut	2nd cut	Total yield	CP yield	WSC yield	ESC yield	Digestible NDF yield	Predicted milk yield
	tons DM ac <sup>-1</sup>		tons ac <sup>-1</sup>			lbs ac <sup>-1</sup>		
AS 6401	1.57ab†	1.26	2.83abcd	0.482	0.305	0.209	1.13	9062
AS 6501	<b>1.91a</b>	1.20	3.12ab	0.422	0.305	0.211	1.06	7083
Blue River 225	1.64ab	1.19	2.83abcd	0.486	0.336	0.236	1.11	8702
Eons	1.35ab	1.21	2.56cde	0.433	0.273	0.192	1.00	8482
FSG 214	1.25ab	1.26	2.51cde	0.420	0.280	0.193	1.01	8909
KF 150	1.24ab	1.49	2.73bcd	0.362	0.316	0.217	0.955	8849
KF 185	1.40ab	1.02	2.42de	0.445	0.259	0.179	0.971	7257
RapidPro 64	1.13b	1.20	2.33de	0.379	0.262	0.181	0.967	8407
RapidPro 77	1.72ab	<b>1.55</b>	<b>3.26a</b>	<b>0.537</b>	<b>0.350</b>	<b>0.237</b>	<b>1.31</b>	<b>10742</b>
Sugar Pro 55	1.08b	1.25	2.33de	0.317	0.206	0.147	0.775	6993
Viking 104	1.48ab	1.50	2.98abc	0.464	0.330	0.229	1.12	10533
Viking 204	1.19ab	1.15	2.34de	0.392	0.266	0.191	0.954	8171
Viking 234	1.07b	0.97	2.04e	0.337	0.215	0.149	0.825	6942
Viking 304	1.36ab	1.10	2.46cde	0.455	0.229	0.160	0.993	7925
LSD (p = 0.10) or p-value‡	0.021	NS§	0.521	NS	NS	NS	NS	NS
Species mean	1.39	1.24	2.62	0.424	0.281	0.195	1.01	8433

†Treatments that share a letter performed statistically similarly to one another. The top performing treatment is indicated in **bold**.

‡Least significant difference at the  $p = 0.10$  level.

§NS; not statistically significant.

**Table 12. Average forage quality of fourteen varieties of sorghum x sudangrass across two harvests, 2025.**

Variety	CP	NDF	WSC	ESC	30-hr NDF digestibility	Predicted milk yield
	% of DM				% of NDF	lbs ton <sup>-1</sup>
AS 6401	16.8	54.4	10.7	7.30cd†	73.6ab	3575
AS 6501	16.0	57.6	11.6	7.97bc	72.5abc	3436
Blue River 225	17.0	<b>53.8</b>	11.8	8.27ab	73.3ab	<b>3653</b>
Eons	16.9	54.2	10.6	7.42bcd	72.3abc	3513
FSG 214	16.8	55.6	11.1	7.58bc	72.9abc	3529
KF 150	14.7	54.7	<b>13.0</b>	<b>8.93a</b>	72.2bc	3443
KF 185	18.2	54.0	10.8	7.42bcd	74.6ab	3592
RapidPro 64	15.9	56.0	11.3	7.70bc	73.8ab	3502
RapidPro 77	16.4	55.8	10.7	7.25cd	72.4abc	3475
Sugar Pro 55	15.3	55.6	10.4	7.43bcd	70.3cd	3455
Viking 104	15.9	55.2	11.0	7.65bc	68.4d	3501
Viking 204	17.0	55.3	11.2	8.08abc	74.1ab	3552
Viking 234	15.9	55.6	10.7	7.38bcd	72.2bc	3560
Viking 304	<b>18.5</b>	53.8	9.37	6.55d	<b>75.2a</b>	3615
LSD (p = 0.10) ‡	NS§	NS	NS	0.935	2.94	NS
Species mean	16.5	55.1	11.0	7.64	72.7	3529

†Treatments that share a letter performed statistically similarly to one another. The top performing treatment is indicated in **bold**.

‡Least significant difference at the  $p = 0.10$  level.

§NS; not statistically significant.

### Sudangrass

The six sudangrass varieties included in the trial produced significantly different dry matter yields at first harvest (Table 13). First cut yields ranged from 0.926 tons ac<sup>-1</sup> to 1.64 tons ac<sup>-1</sup> with the highest yield being produced by EnergyPro 93. This was statistically similar to AS 9301 and Viking 510. Yields at the second harvest did not vary statistically and averaged 1.42 tons ac<sup>-1</sup>. Total season yields thus varied between varieties with EnergyPro 93 producing the highest yields of 3.23 tons ac<sup>-1</sup> which was statistically similar to AS 9301 and Viking 510. EnergyPro 93 was one of only three varieties across all species in the trial to produce over 3.00 tons ac<sup>-1</sup>, the other two being sorghum x sudangrass varieties.

**Table 13. Dry matter and quality component yields of six varieties of sudangrass, 2025.**

Variety	1st cut	2nd cut	Total	CP	WSC	ESC	Digestible	Predicted
	tons DM ac <sup>-1</sup>		yield	yield	yield	yield	NDF yield	milk yield
								lbs ac <sup>-1</sup>
AS 9301	1.49ab†	1.41	2.91ab	0.517a	0.333	0.232	1.17a	10192
EnergyPro 93	<b>1.64a</b>	<b>1.59</b>	<b>3.23a</b>	<b>0.535a</b>	<b>0.364</b>	<b>0.251</b>	<b>1.30a</b>	<b>11459</b>
<i>Experimental line</i>	0.962c	1.47	2.43bc	0.309b	0.237	0.162	0.777b	8752
KF 200	1.14bc	1.29	2.43bc	0.370b	0.234	0.151	0.800b	7899
Piper	0.926c	1.29	2.21c	0.351b	0.253	0.175	0.824b	9148
Viking 510	1.37abc	1.49	2.86ab	0.505	0.318	0.215	1.14a	10540
LSD (p = 0.10) or p-value‡	0.003	NS§	0.490	0.125	NS	NS	0.295	NS
Species mean	1.26	1.42	2.68	0.431	0.290	0.198	1.00	9665

†Treatments that share a letter performed statistically similarly to one another. The top performing treatment is indicated in **bold**.

‡Least significant difference at the p = 0.10 level.

§NS; not statistically significant.

In terms of forage quality, these sudangrass varieties only differed statistically in fiber digestibility (Table 14). Crude protein content ranged from 14.9% to 17.6% and averaged 16.8% with no statistical differences between varieties. Fiber and WSC contents were consistent across varieties averaging 54.0% and 11.3% respectively. Fiber digestibility ranged from 67.5% to 75.3% and did differ statistically with the Experimental line and Piper producing significantly lower fiber digestibility than the other varieties.

**Table 14. Average forage quality of six varieties of sudangrass across two harvests, 2025.**

Variety	CP	NDF	WSC	ESC	30-hr NDF	Predicted milk
	% of DM				digestibility	yield
					% of NDF	lbs ton <sup>-1</sup>
AS 9301	<b>17.6</b>	<b>53.4</b>	<b>11.5</b>	<b>7.97</b>	<b>75.3a†</b>	3596
EnergyPro 93	16.5	54.2	11.2	7.75	74.4a	3602
<i>Experimental line</i>	14.9	55.4	11.2	7.67	67.5c	3521
KF 200	17.3	53.6	11.3	7.27	72.7ab	<b>3606</b>
Piper	16.8	53.4	11.3	7.85	70.2bc	3562
Viking 510	17.6	54.2	11.2	7.57	74.0a	3561
LSD (p = 0.10) ‡	NS§	NS	NS	NS	3.47	NS
Species mean	16.8	54.0	11.3	7.68	72.3	3575

†Treatments that share a letter performed statistically similarly to one another. The top performing treatment is indicated in **bold**.

‡Least significant difference at the p = 0.10 level.

§NS; not statistically significant.

This in combination with the differences in dry matter yield contributed to significant differences in yield of digestible fiber. The varieties EnergyPro 93, AS 9301, and Viking 510 all produced over 1 ton ac<sup>-1</sup> of digestible fiber whereas the other three produced around 0.8 tons ac<sup>-1</sup>. Despite some differences in dry matter yield and quality metrics, the predicted milk yields both per ton of forage and per acre did not differ statistically between varieties.

## DISCUSSION

Summer annual forages can be a valuable addition to a grazing or stored forage system in the Northeast. The relatively warm and very dry conditions of 2025 demonstrated this with average yields exceeding 2.5 tons ac<sup>-1</sup> over two harvests with three varieties producing over 3.0 tons ac<sup>-1</sup>. Forage quality of all these treatments were high with relatively high protein, sugar, and digestible fiber contents. Comparisons between all treatments are summarized in Table 15. Several years of data should be considered before making varietal selections. With growing summer annuals, it is important to also be aware of the risk of nitrate accumulation and the presence of prussic acid. Nitrates are considered relatively safe for feed up to 5000 ppm, however, there is a risk of excessive nitrate accumulation under excessive fertility, and immediately after a drought stressed crop receives rainfall. Additionally, sorghums, sudangrasses, and hybrids may contain prussic acid, which can be toxic. To avoid prussic acid poisoning from summer annuals:

- Graze when the grasses are at least 18 inches tall.
- Do not graze plants during and shortly after drought periods when growth is severely reduced.
- Do not graze wilted plants or plants with young tillers.
- Do not graze after a non-killing frost; regrowth can be toxic.
- Do not graze after a killing frost until plant material is dry (the toxin usually dissipates within 48 hours).
- Do not graze at night when frost is likely. High levels of toxins are produced within hours after frost.
- Delay feeding silage six to eight weeks following ensiling.

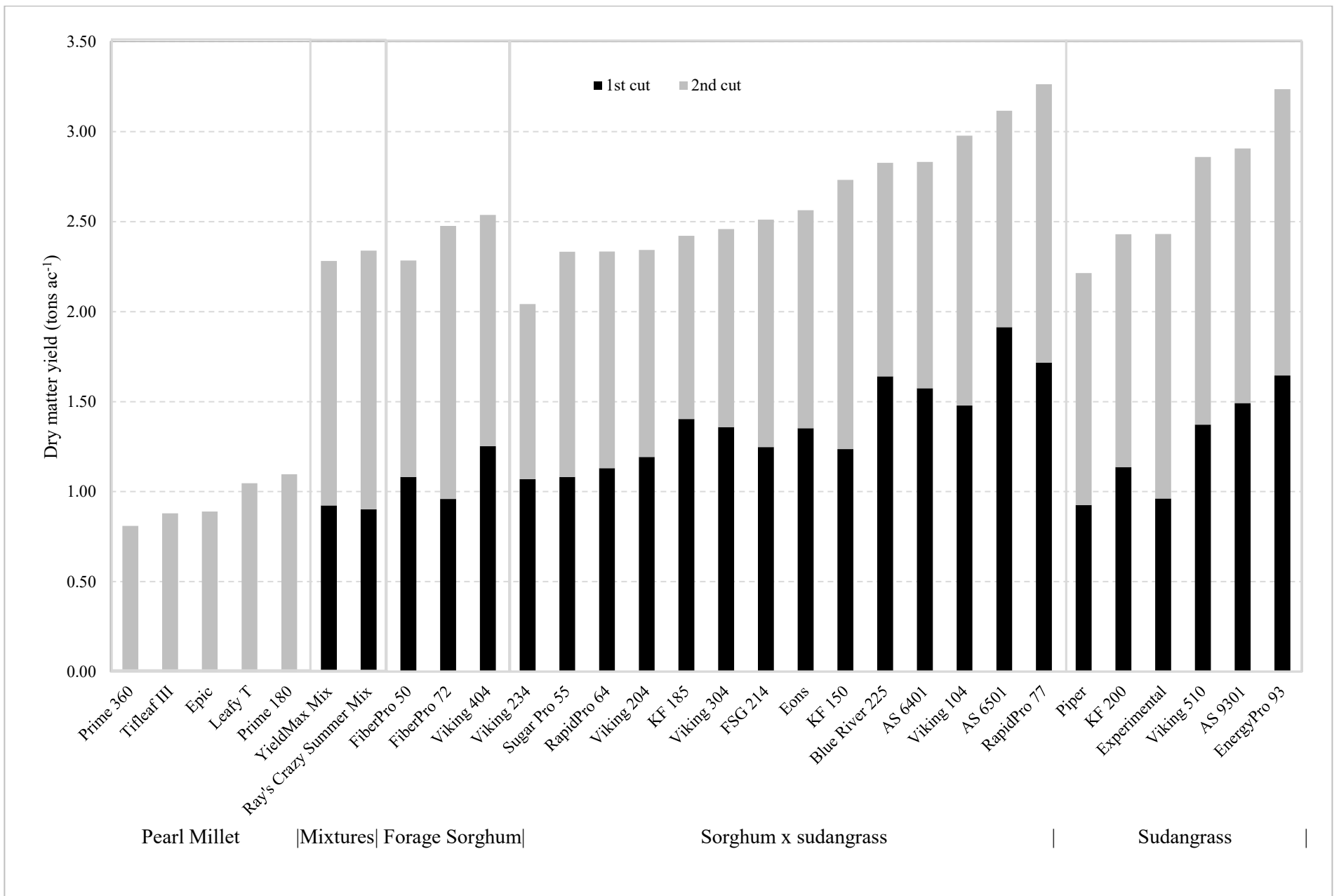
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**Figure 1. Dry matter yields across two harvests for thirty varieties of four summer annual forage species and pre-made mixtures, 2025.**

\*Pearl millet 1<sup>st</sup> cut yields not available due to harvest error.

**Table 15. Yield and quality of 30 summer annual forage varieties, 2025.**

Species	Variety	1st cut	2nd cut	Season	CP	WSC	ESC	NDFD	Milk	CP	NDF	WSC	ESC	NDFD	Milk
		-----tons ac <sup>-1</sup> -----								lbs ac <sup>-1</sup>	-----% DM-----				% NDF
SS	AS 6401	1.57	1.26*	2.83*	0.482*	0.305*	0.209*	1.13*	9062	16.8	54.4	10.7	7.30	73.6*	3575
SS	AS 6501	<b>1.91</b>	1.20*	3.12*	0.422*	0.305*	0.211*	1.06*	7083	16.0	57.6	11.6*	7.97	72.5	3436
Sudan	AS 9301	1.49	1.41*	2.91*	0.517*	0.333*	0.232*	1.17*	10192	17.6*	53.4	11.5*	7.97	75.3*	3596
SS	Blue River 225	1.64	1.19	2.83*	0.486*	0.336*	0.236*	1.11*	8702	17.0	53.8	11.8*	8.27	73.3*	3653
Sudan	EnergyPro 93	1.64	<b>1.59</b>	3.23*	0.535*	<b>0.364</b>	<b>0.251</b>	1.30*	<b>11459</b>	16.5	54.2	11.2	7.75	74.4*	3602
SS	Eons	1.35	1.21*	2.56	0.433*	0.273	0.192	1.00	8482	16.9	54.2	10.6	7.42	72.3	3513
PM	Epic	N/A	0.890	0.890	0.130	0.084	0.064	0.340	6660	17.4*	53.3	9.75	7.45	74.2*	<b>3754</b>
Sudan	<i>Experimental line</i>	0.962	1.47*	2.43	0.309	0.237	0.162	0.777	8752	14.9	55.4	11.2	7.67	67.5	3521
SS	FSG 214	1.25	1.26*	2.51	0.420*	0.280	0.193	1.01	8909	16.8	55.6	11.1	7.58	72.9*	3529
FS	FiberPro 50	1.08	1.20*	2.28	0.390	0.212	0.155	0.922	8194	17.1	55.8	9.37	6.85	72.8*	3398
FS	FiberPro 72	0.926	1.52*	2.48	0.401	0.277	0.204*	0.960	10925	16.4	53.4	11.6*	8.45	72.4	3591
SS	KF 150	1.24	1.49*	2.73	0.362	0.316*	0.217*	0.955	8849	14.7	54.7	<b>13.0</b>	8.93	72.2	3443
SS	KF 185	1.40	1.02	2.42	0.445*	0.259	0.179	0.971	7257	18.2*	54.0	10.8	7.42	74.6*	3592
Sudan	KF 200	1.14	1.29*	2.43	0.370	0.234	0.151	0.800	7899	17.3*	53.6	11.3*	7.27	72.7*	3606
PM	Leafy T	N/A	1.05	1.05	0.156	0.107	0.081	0.423	7680	16.9	55.6	9.75	7.42	74.7*	3625
Sudan	Piper	0.926	1.29*	2.21	0.351	0.253	0.175	0.824	9148	16.8	53.4	11.3*	7.85	70.2	3562
PM	Prime 180	N/A	1.10	1.10	0.150	0.110	0.080	0.423	7614	17.9*	54.4	8.85	6.65	73.3*	3556
PM	Prime 360	N/A	0.810	0.810	0.112	0.075	0.057	0.338	5550	15.3	57.3	9.10	6.87	72.3	3470
SS	RapidPro 64	1.13	1.20*	2.33	0.379	0.262	0.181	0.967	8407	15.9	56.0	11.3	7.70	73.8*	3502
SS	RapidPro 77	1.72	1.55*	<b>3.26</b>	<b>0.537</b>	0.350*	0.237*	<b>1.31</b>	10742	16.4	55.8	10.7	7.25	72.4	3475
Mix	Ray's Crazy Summer Mix	0.902	1.44*	2.34	0.438*	0.239	0.174	0.852	10628	<b>19.2</b>	<b>48.0</b>	10.2	7.47	<b>75.5</b>	3733
SS	Sugar Pro 55	1.08	1.25*	2.33	0.317	0.206	0.147	0.775	6993	15.3	55.6	10.4	7.43	70.3	3455
PM	Tifleaf III	N/A	0.880	0.880	0.121	0.082	0.065	0.371	6028	15.1	57.3	9.28	7.15	71.9	3438
SS	Viking 104	1.48	1.50*	2.98*	0.464*	0.330*	0.229*	1.12*	10533	15.9	55.2	11.0	7.65	68.4	3501
SS	Viking 204	1.19	1.15	2.34	0.392	0.266	0.191	0.954	8171	17.0	55.3	11.2	8.08	74.1*	3552
SS	Viking 234	1.07	0.972	2.04	0.337	0.215	0.149	0.825	6942	15.9	55.6	10.7	7.38	72.2	3560
SS	Viking 304	1.36	1.10	2.46	0.455*	0.229	0.160	0.993	7925	18.5*	53.8	9.37	6.55	75.2*	3615
FS	Viking 404	1.24	1.28*	2.54	0.386	0.300*	0.222*	0.968	9115	15.2	54.2	11.8*	8.73	70.7	3544
Sudan	Viking 510	1.37	1.49*	2.86*	0.505*	0.318*	0.215*	1.14*	10540	17.6*	54.2	11.2	7.57	74.0*	3561
Mix	YieldMax Mix	0.923	1.36*	2.28	0.396	0.237	0.167	0.872	9581	17.8*	53.4	10.5	7.42	72.4	3517
LSD (p = 0.10)		<.0001	NS	0.519	0.119	0.081	0.055	0.264	NS	1.98	2.41	1.67	NS	2.99	NS
Trial mean		1.28	1.25	2.32	0.373	0.246	0.173	0.889	8601	16.7	54.6	10.7	7.58	72.7	3549.113

P-value listed for 1<sup>st</sup> cut, rest Least Significant Difference (LSD) at p=0.10 level; NS not statistically significant. \*Treatments with an asterisk performed similarly to the top performer in **bold**.