SOUTH DAKOTA–Evaluation of Cover Crop Mixes for Forage Supply

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Farmers often look for ways to increase revenue. In the Upper Great Plains it might not be economical, or practical, to plant another grain crop during the growing year; however, cover crops should be considered as they provide multiple benefits. The primary benefit is more forage production which can be used for on-farm use or sold. Environmentally friendly cover crops improve soil quality by protecting it from erosion, increased soil microbial activity, and nutrient cycling, all while managing nitrogen and adding carbon. Our objective was to evaluate different cover crop blends for total forage production and forage quality.

Table 1. Cover crop blends used and their main components.

Blend	Main Components
Prevent Plant	15% Radish; 7.5% Rapeseed; 15% Crimson Clover; 20% Grazing Sudan; 42.5% Forage Peas
Early Grazing	62% Forage Oats; 15% Millet; 15% Grazing Sudan; 4% Crimson Clover; 2% Radish; 2% Forage Turnip
The Producer	25% Purple Top Turnip; 25% Common Vetch; 20% Cover Crop Radish; 15% Flax; 15% Forage Oats
Balance Plus	30% Turnip; 25% Common Vetch; 20% Cover Crop Radish; 15% Sorghum Sudangrass; 10% Flax
Classic Trio	40% Cover Crop Radish; 30% Dwarf Essex Rapeseed; 30% Purple Top Turnip
Soil Builder	60% Forage Oats; 20% Grazing Sudan; 12% Lentils; 4% Forage Turnip; 4% Radish
Feedlot	65.7% Spring Wheat; 14.3% Lacey Barley; 10% Grazing Sudan; 5% Rapeseed; 5% Radish
Aerial	52.2% Rye; 26.5% Forage Oats; 5.3% Crimson Clover; 5.3% Radish; 5.3% Turnip; 2.6% Vetch; 2.8% Rapeseed
Premium Graze	25% Millet; 25% Turnip; 20% Cow Conditioner; 20% Winfred Brassica; 10% Grazing Radish
Mid-Late Grazing	60% Forage Oats; 20% Grazing Sudan; 12% Lentils; 4% Forage Turnip; 4% Radish

Small plots (3' x 10') were planted in July 2017 in a Randomized Complete Block Design with three replicates at the Northeast Research Farm (NE) near South Shore, SD, and Southeast Research Farm (SE) near Beresford, SD. Five to six cover crop blends from each location were used to examine total dry matter (DM) content and forage quality; DM concentration was determined by collecting a sample of harvested biomass and drying at 60˚C for 62 hours in a forced-air oven and reweighing the dried biomass. The biomass was sent to SGS North America in Brookings, SD, for forage quality analyses. It was analyzed using standard ANOVA techniques in Statistix 7 (Analytical Software, 2000). A least significant difference was used to separate means when the appropriate F test was statistically significant (P=0.05). Quality data was used to support and provide knowledge on cover crop performance. Total biomass and forage quality were determined at two locations during 2017 (Table 2). Yield did not increase significantly and forage quality varied among blends.

Table 2. 2017 yield (DM ton/ac) and forage quality (%) at NE and SE, respectively.

Blend	DM		CP		ADF		NDF		RFV		Total N	
Prevent Plant	0.51	0.59	21.2	20.2	31.4	32.3	50.3	47.7	135.5	141.7	2.7	2.7
Early Grazing	0.74	0.50	25.4	17.1	29.9	38.9	49.0	53.4	141.7	117.9	3.2	1.9
The Producer	0.71	0.20	22.4	20.0	32.5	33.1	52.0	43.9	130.1	154.6	2.9	2.7
Balance Plus	0.49	0.13	24.9	21.8	32.9	30.4	50.4	43.9	135.1	158.8	3.1	2.7
Classic Trio	0.59	0.39	23.7	17.9	30.5	36.3	47.2	51.7	146.3	125.6	3.0	2.2
Soil Builder	0.89	0.36	25.5	21.4	29.8	30.1	48.1	42.5	144.7	163.9	3.2	2.8
Feedlot	0.52	0.40	24.4	16.7	32.3	37.8	53.3	52.9	127.5	119.7	3.1	2.1
Aerial Mix	1.03	0.46	23.3	17.2	33.4	37.1	51.0	52.6	131.6	121.3	2.9	2.1
Premium Graze	0.30	0.23	22.2	14.9	33.6	37.2	51.8	57.4	128.6	112.4	2.8	2.0
Mid-Late Grazing	0.42	0.20	26.2	16.3	27.9	38.2	48.2	53.3	146.7	119.1	3.5	2.2

DM-dry matter; CP-Crude Protein; ADF-Acid Detergent Fiber; NDF-Neutral Detergent Fiber; RFV-Relative Feed Value; Total N-Total Nitrogen

Even though cover crops can be grown as single species or in a mixture of variety of plant species, they are mostly marketed and grown as blends. In a grazing system it is important to consider the quality of the cover crop to provide good forage for cattle.