South Dakota State University
College of Agriculture, Food and Environmental Sciences

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South Dakota Agricultural Experiment Station at SDSU

Winter Rye and Winter Triticale Forage Variety Trials at the Southeast Research Farm – 2024 Season

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Introduction

Winter annual forages offer opportunity for producing forage relatively early in the season and allow for double cropping if moisture is adequate. Winter rye, for example, grows very rapidly from mid to late May, and correspondingly uses a lot of moisture during this period. Forage taken as hay, silage or by grazing can be followed up with soybeans, forage sorghum, or other warm season forages. In a year with good soil moisture, we have had good success following winter rye with soybeans; however, in a drought year we have seen soybean yield loss of 50 % or more associated with the loss of moisture used by the rye silage crop. This trial evaluates several lines of rye for forage production, along with three forage wheat lines of interest and two winter triticale lines for comparison.

Methods

Winter triticale and winter rye forage variety trials were conducted with a farmer-cooperator at Wagner, South Dakota, and at the SDSU Southeast Research Farm in Beresford, South Dakota in 2024. The trials were direct seeded into soybean stubble on Oct. 2, 2023 at Beresford, and on Oct. 10, 2023 at Wagner, South Dakota. Plots were laid out in a randomized complete block design with four replications at each site. Plot size was 5 by 25'. Plots in Beresford were fertilized with 21 lb/ac of N and 5 lb/ac of S in the fall, and topdressed with 80 lb/ac of N in the spring. The plots in Wagner were fertilized with 40-34-10-23 lb/ac NPKS in the fall, and topdressed with 40 lbs/ac N in the spring. The forage rye and forage triticale, plots were harvested on May 17 and May 21, 2024, respectively at Beresford. At Wagner both the rye and triticale plots were harvested on May 20, 2024. Plant heights were taken along with growth stage using the Feekes scale before harvest. Most of the plots were in the boot stage at time of harvest. The ends were trimmed, plot lengths were recorded, and plots were harvested with a small plot forage harvester at both sites. Subsamples were taken for determination of percent moisture at harvest. Silage yield was estimated assuming 65 % moisture. A composite sample for each line at each site was analyzed for forage quality using NIR 9 analysis at a commercial laboratory (Ward Labs, Kearney, Nebraska).

Results

The average dry matter yield for triticale across treatments was 3.29 tons per acre at Wagner, and 3.42 tons per acre at Beresford (Tables 1 and 2, respectively). The average dry matter yield in the forage rye trials was 3.34 tons/ac at Wagner, and 2.87 tons/ac at Beresford (Tables 3 and 4, respectively). In previous seasons, winter rye has tended to out-perform winter triticale in terms of tonnage produced; however, in this year (2024) the better triticale lines performed as well as the 'Hazlet' rye check treatment (Tables 1 and 2). The fall of 2023 and the spring of 2024 were favorable for establishment and growth of winter cereals; under these more favorable conditions, the better triticale lines were similar in production to the better rye lines. In seasons where conditions were more stressful, rye tends to outperform both triticale and wheat in terms of dry matter production. As observed in other years, the OP line 'Hazlet' performed as well as hybrid rye lines for total forage production.

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Table 1. Plant height, Feeke's stage, dry matter production, estimated silage yield, TDN, RFV, and crude protein level from winter triticale variety trials conducted at Wagner, South Dakota in 2024. Yields are based on whole plot weights taken from three field replicates laid out in a randomized complete block design. Forage quality data are based on a single pooled sample taken for each line tested.

Line	Type	Height (in)	Feek's Stage	Dry Matter Forage (ton/ac)	Silage Yield (ton/ac)	TDN* (%)	RFV* (%)	Crude Protein* (%)
Gainer 154	Triticale	35.4	10.3	**3.83**	**10.93**	59.9	112	19.9
Hazlet	Rye	**43.7**	10.4	**3.55**	**10.15**	56.7	107	18.0
Flex 719	Triticale	37.1	8.8	**3.54**	**10.12**	57.4	116	22.3
Fridge	Triticale	34.6	8.0	3.53	10.08	54.5	102	16.7
FX 1001	Triticale	36.9	9.0	3.42	9.76	54.6	102	18.6
Gunner	Triticale	32.9	8.0	3.38	9.64	52.6	94	15.4
Blade W01	Triticale	30.5	9.0	3.26	9.30	59.4	118	21.4
Blade F02-A	Triticale	31.1	8.5	3.23	9.22	59.3	121	21.5
Valor	Barley	33.9	10.4	2.94	8.41	54.0	93	15.9
MTF 1435	Wheat	28.7	8.3	2.88	8.24	55.0	100	16.3
Willow Creek	Wheat	22.6	8.0	2.60	7.43	56.9	106	13.9
Mean		33.4	9.0	3.29	9.39	56.4	106	18.2
CV (%)		4.5	-	7.5	7.5	-	-	-
LSD (0.10)		1.8	-	0.29	0.84	-	-	-

* NIR analysis from unreplicated, composite samples

Table 2. Plant height, Feeke's stage, dry matter production, estimated silage yield, TDN, RFV, and crude protein level from winter triticale variety trials conducted at Beresford, South Dakota in 2024. Yields are based on whole plot weights taken from three field replicates laid out in a randomized complete block design. Forage quality data are based on a single pooled sample taken for each line tested.

Line	Type	Height (in)	Feek's Stage	Dry Matter Forage (ton/ac)	Silage Yield (ton/ac)	TDN* (%)	RFV* (%)	Crude Protein* (%)
Hazlet	Rye	**44.5**	10.5	**3.84**	**10.98**	-	-	-
Fridge	Triticale	32.2	10.3	**3.80**	**10.86**	54.5	96	16.3
Flex 719	Triticale	39.5	10.0	**3.80**	**10.86**	56.2	100	18.8
Blade W01	Triticale	35.7	10.3	**3.67**	**10.50**	59.4	107	18.3
Grainer 154	Triticale	37.9	10.4	**3.65**	**10.42**	54.6	95	16.5
Blade F02-A	Triticale	36.7	10.0	**3.64**	**10.40**	61.7	129	24.4
FX 1001	Triticale	**43.5**	10.0	**3.64**	**10.39**	53.0	95	16.7
Gunner	Triticale	35.1	10.0	3.22	9.19	54.5	100	18.9
MTF 1435	Wheat	30.8	9.0	2.94	8.40	52.3	91	16.0
Willow Creek	Wheat	25.6	8.0	1.95	5.57	58.5	111	21.4
Mean		36.4	9.7	3.42	9.76	56.1	103	18.6
CV (%)		7.1	-	8.2	8.2	-	-	-
LSD (0.10)		3.6	-	0.39	1.12	-	-	-

* NIR analysis from unreplicated, composite samples

Table 3. Plant height, Feeke's stage, dry matter production, estimated silage yield, TDN, RFV, and crude protein level from winter rye variety trials conducted at Beresford, South Dakota in 2024. Yields are based on whole plot weights taken from three field replicates laid out in a randomized complete block design. Forage quality data are based on a single pooled sample taken for each line tested.

Line	Type	Height (in)	Feek's Stage	Dry Matter Forage (ton/ac)	Silage Yield (ton/ac)	TDN* (%)	RFV* (%)	Crude Protein* (%)
Hazlet	OP Rye	44.4	10.4	**3.80**	**10.85**	49.6	81	14.1
Aviator	Hybrid Rye	**45.5**	10.5	**3.71**	**10.60**	47.3	81	14.3
Aroostook	OP Rye	43.2	10.5	**3.62**	**10.35**	51.0	88	15.9
H240	Hybrid Rye	42.5	10.4	3.59	10.26	52.1	89	16.0
Progas	Hybrid Rye	43.0	10.4	3.59	10.26	53.4	96	18.1
H238	Hybrid Rye	43.6	10.4	3.58	10.22	44.4	74	12.8
Danko	OP Rye	**45.6**	10.5	3.57	10.20	47.4	75	13.5
H10129	Hybrid Rye	43.1	10.4	3.40	9.71	54.0	99	19.6
FX 1001	Triticale	38.6	9.0	3.29	9.39	55.0	101	18.2
ND Gardner	OP Rye	**48.5**	10.5	3.23	9.22	49.5	85	15.1
MTF 1435	Wheat	30.0	9.0	2.70	7.70	53.4	96	18.6
Willow Creek	Wheat	27.6	8.3	2.05	5.87	54.0	97	16.6
Mean		41.3	10.0	3.34	9.55	50.9	89	16.1
CV (%)		7.7	-	5.0	5.0	-	-	-
LSD (0.10)		4.4	-	0.20	0.57	-	-	-

* NIR analysis from unreplicated, composite samples

Table 4. Plant height, Feeke's stage, dry matter production, estimated silage yield, TDN, RFV, and crude protein level from winter triticale variety trials conducted at Beresford, South Dakota in 2024. Yields are based on whole plot weights taken from three field replicates laid out in a randomized complete block design. Forage quality data are based on a single pooled sample taken for each line tested.

Line	Type	Height (in)	Feek's Stage	Dry Matter Forage (ton/ac)	Silage Yield (ton/ac)	TDN* (%)	RFV* (%)	Crude Protein* (%)
FX 1001	Triticale	36.1	9.0	**3.81**	**10.88**	57.2	104	19.5
ND Gardner	OP Rye	**48.6**	10.5	3.22	9.19	52.7	89	15.8
Hazlet	OP Rye	38.7	10.2	3.19	9.13	52.7	90	16.8
Aroostook	OP Rye	39.2	10.2	3.16	9.03	57.4	107	18.7
Aviator	Hybrid Rye	39.4	10.2	3.09	8.83	51.2	85	13.3
Danko	OP Rye	39.7	10.3	2.96	8.45	49.7	78	11.0
Progas	Hybrid Rye	37.4	10.1	2.94	8.40	47.5	80	12.6
H10129	Hybrid Rye	37.9	10.1	2.89	8.27	56.5	101	18.3
H240	Hybrid Rye	36.7	10.1	2.89	8.25	56.8	102	20.0
H238	Hybrid Rye	36.2	10.1	2.65	7.56	56.3	98	17.7
MTF 1435	Wheat	24.0	8.8	1.84	5.26	64.8	138	26.7
Willow Creek	Wheat	20.4	8.0	1.79	5.11	63.8	135	25.4
Mean		36.2	9.8	2.87	8.20	55.6	101	18.0
CV (%)		5.0	-	8.0	8.0	-	-	-
LSD (0.10)		2.5	-	0.32	0.90	-	-	-

* NIR analysis from unreplicated, composite samples