

NORTH DAKOTA– Forage Production & Quality, Livestock Performance, & Cost Comparison for Winter Cereal Forages

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Winter cereal forages are biennial cereal crops sown in late summer to early fall. In this experiment, we tested 3 winter cereal types; rye, triticale, and wheat (Willow Creek). Winter rye is considered the most winterhardy of all cereal grains and fastest growing the following spring. Winter triticale is a hybrid developed by crossing winter wheat and winter rye. Winter triticale is considered winterhardy and often superior to rye for silage, hay, and pasture. Winter wheat – Willow Creek – has good winter hardiness, is later-maturing than rye and triticale, and considered a high-quality forage.

This study was conducted at Central Grasslands Research Extension Center near Streeter from September 2019 to June 2020. Experimental plots were 10-acre pastures, with three replicates of each winter cereal. Soils were gravelly sandy loam soils and precipitation was above normal when the crops were seeded and below normal during spring growth.

All fields have been in no-till for 14 years or more and were sprayed with 1 quart of glyphosate + 1 oz of Sharpen/ac on the same day each field was seeded. Winter cereals were seeded September 5, 2019, at 90 lbs/ac. Each field was grazed with yearling heifers from May 11 to June 8, 2020, (28 days) to achieve 60-70% disappearance.

Stocking rate was projected using the May 8, 2020, clippings from each crop type, with winter rye, triticale, and wheat stocked at 2.49, 1.45, and 1.43 heifers/ac, respectively. Livestock performance was determined by collecting 2-day weights prior to turnout and after grazing ended. All nutritional analysis was conducted at the NDSU Nutrition Lab using Association of Official Agricultural Chemists (AOAC) standards. Total digestible nutrients (TDN) were determined using acid detergent fiber (ADF) and energy equation for grass ($98.625 - [1.048 \times \text{ADF}]$).

Winter rye was the most productive and fastest growing winter cereal, followed by triticale and wheat (Table 1). Winter wheat was highest in crude protein (CP) and TDN, and lower in acid detergent lignin (ADL) than rye. Winter rye had the best livestock performance, with heifers gaining 0.97 lb/day. Heifers on winter triticale and wheat gained 0.04 and -0.06 lb/day, respectively. Poor performance on winter wheat can be explained due to lack of available forage throughout the grazing period, as it grew slower in May compared to rye and triticale (Table 1).

Table 1. Forage quality content for winter rye, winter triticale, and winter wheat – Willow Creek at Central Grasslands Research Extension Center near Streeter, ND, in 2020.

Winter Cereal Crop	CP (%)		ADL (%)		TDN (%)		Yield (lb/ac)			Average Daily Gain (lb/day)	Cost/Day to graze ¹
	May 22	June 1	May 22	June 1	May 22	June 1	May 8	May 22	June 1	May 11 – June 8	May 11 – June 8
Rye ²	8.7 ^a	6.7 ^a	2.4	4.2 ^a	68.6 ^a	61.2 ^a	1165 ^a	2509 ^a	3610 ^a	0.97 ^a	\$1.02
Triticale	10.4 ^{ab}	7.8 ^a	2.3	2.8 ^b	70.8 ^b	65.7 ^b	775 ^b	1940 ^b	3177 ^b	0.04 ^b	\$2.03
Wheat, Willow Creek	12.3 ^b	9.2 ^b	2.4	2.5 ^b	71.4 ^b	69.2 ^c	891 ^b	1426 ^c	1771 ^c	-0.06 ^b	\$1.92

¹Total costs per acre include custom farm rates (USDA, National Agricultural Statistics Service, 2020) for no-till seeding rate (\$17.80/ac), custom herbicide application (\$6.57/ac), actual cost of herbicide (glyphosate + Sharpen; \$5.60/ac), land rent (\$22.45/ac) and seed cost.

²Values within a column comparing winter cereal crops with the same letter (a,b,c) are not different ($P > 0.05$).

Cost to graze heifers on winter rye was \$1.02/day and more economical than both triticale and wheat (Table 1). Due to winter wheat's slow growth in May, grazing in May would not be recommended compared to winter rye and triticale. Winter wheat was still in the vegetative growth stage on June 1 and would be much more economical to harvest in mid- to late June as hay.