

NORTH DAKOTA—Perennial Grasses Yield & Nutritive Value in the Seeding Year

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Perennial cool-season grasses are commonly used for hay in the Midwest. The objective of this study was to evaluate new perennial cool-season grass varieties for improved forage yield, quality, and winter hardiness across two locations in North Dakota.

The experiment was conducted at North Dakota State University research sites. The design was a randomized complete block with four replicates. Experiments were sown on 1 May and 19 May in 2020 in Fargo and Prosper, respectively. Experimental units were 25' long and 5' wide consisting of eight rows 6" apart. Several varieties of orchardgrass, meadow fescue, tall fescue, perennial ryegrass, meadow brome, smooth brome, crested wheatgrass (CWG), intermediate wheatgrass (IWG), and creeping wheatgrass (hybrid between CWG and IWG) were evaluated (Table 1).

Forage yield ranged 286–4,139 lbs DM/ac. The lowest-yielding grass was Esquire, a perennial ryegrass, resulting from the variety's high susceptibility to rust, which defoliated the plants. Smooth brome variety BAR BIF 1GRL had the highest forage yield, but it was not different statistically from all of the tall fescue varieties tested.

Crude protein was not different among varieties and ranged 10.7–14.8%. Fiber digestibility and total digestible nutrients were the highest for all tall fescue and meadow fescue varieties. The results indicate that there is great variability in forage yield potential between species and between varieties within species. Winter survival has not yet been evaluated.

Table 1. Forage yield, crude protein (CP), neutral detergent digestibility (NDFD48), total digestible nutrients (TDN), and relative forage quality (RFQ) for perennial grass variety values averaged across Fargo and Prosper, ND.

	Variety	Yield lbs/ac	CP	NDFD48	TDN	RFQ
			-----%-----			
Orchardgrass	BAR DG2211	4030 ^{abc}	11.8	57.7 ^{abc}	67.2 ^{cdefgh}	131 ^{defg}
	Dg83R01	3510 ^{abcde}	12.0	58.0 ^{ab}	67.8 ^{cdefg}	133 ^{bcd}
	BAR DGLF48	3466 ^{abcde}	12.2	58.2 ^{ab}	67.4 ^{cdefg}	132 ^{def}
	Intensiv	3710 ^{abcd}	12.0	58.0 ^{ab}	67.5 ^{cdefg}	131 ^{defg}
Meadow fescue	BAR FPF32	2774 ^{abcde}	12.3	58.7 ^a	69.1 ^{abcde}	146 ^{ab}
	BAR FP1941	2632 ^{abcde}	12.3	59.3 ^a	69.7 ^{abcd}	149 ^a
	Pradel	2419 ^{def}	12.7	59.1 ^a	69.9 ^{abc}	147 ^a
Tall fescue	BAR FAFP1962	2766 ^{abcde}	12.0	58.3 ^{ab}	70.1 ^{abc}	146 ^{ab}
	BAR FA1456	2474 ^{abcde}	11.8	57.8 ^{abc}	70.2 ^{abc}	143 ^{abcd}
	BAR FaF131	3874 ^{abcd}	11.0	58.0 ^{ab}	71.1 ^a	144 ^{abcd}
	7FACF82	2891 ^{abcde}	11.6	57.3 ^{abcd}	69.6 ^{abcd}	140 ^{abcde}
	BAR FAF135	3147 ^{abcde}	12.2	57.6 ^{abcd}	69.9 ^{abc}	140 ^{abcde}
	BarOptima+E34	4055 ^{ab}	11.2	58.3 ^{ab}	70.5 ^{ab}	142 ^{abcd}
Perennial ryegrass	LPTROM99	1923 ^{ef}	10.7	59.0 ^a	66.8 ^{defgh}	144 ^{abc}
	ROMNEA	2740 ^{abcde}	11.7	59.1 ^a	67.2 ^{cdefgh}	144 ^{abcd}
	Esquire	286 ^g	14.8	53.1 ⁱ	65.3 ^{fghi}	133 ^{bcd}
Meadow brome	BAR BCF 1FRRL	3530 ^{abcd}	11.5	58.3 ^{ab}	65.0 ^{fghi}	123 ^{gh}
	Macbeth	2793 ^{abcde}	11.0	58.3 ^{ab}	65.2 ^{fghi}	127 ^{efgh}
Smooth brome	BAR BIF 1GRL	4139 ^a	12.8	54.4 ^{ef}	63.7 ⁱ	118 ^h
	Manchar	2985 ^{abcde}	12.3	55.7 ^{cde}	65.1 ^{fghi}	122 ^{gh}
CWG	BAR CWG	2437 ^{cdef}	10.8	55.4 ^{de}	64.8 ^{fghi}	121 ^{gh}
	Hycrest	1288 ^g	11.6	53.0 ^j	64.4 ^{hi}	115 ^h
IWG	Oahe	2800 ^{abcde}	12.8	55.0 ^{ef}	64.8 ^{ghi}	118 ^{gh}
Mix	BAR BAR5061	2971 ^{abcde}	11.7	56.1 ^{bcd}	66.4 ^{efghi}	125 ^{gh}

Values within columns followed by same letter are not significantly different at the $P \leq 0.05$ level. CWG=crested wheatgrass; IWG=intermediate wheat grass; Mix had IWG, creeping wheatgrass, and smooth brome