ALFALFA VARIETY TRIAL, 1982 - 1984

Hettinger Experiment Station

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An alfalfa variety trial was seeded at the Hettinger Experiment Station in May 1981. The 10 x 25 foot plots were arranged in a randomized block design with three replications. The alleys between the replications were five feet wide. The trial was designed to evaluate the performance of the varieties in southwestern North Dakota on the basis of dry weight herbage production and compared to a standard variety (Vernal). Six pasture type, nineteen dryland hay type and two hay and pasture type varieties were included in the trial. One cutting in late June or early July has been made annually since 1982.

The annual above ground dry weight herbage production for each variety and the percentage of production compared to a standard variety (Vernal) are shown in Table 1. The five highest producing varieties for 1982 were Prowler, Travois, Spredor II, Nugget, and Iroquois with 5244, 5191, 4986, 4790 and 4782 pounds of herbage production per acre respectively. The five highest producing varieties for 1983 were Nugget, Drylander, Prowler, Ladak 65 and Spredor II with 6071, 5528, 5212, 5114 and 5079 pounds per acre of herbage production respectively. The five highest producing varieties for 1984 were Spredor II, Drylander, Norseman, Vernal and Travois and D-111 with 4564, 4267, 3848, 3619 and 3509 pounds per acre of herbage production respectively.

The production data from this trial has shown that there was very little difference between most of the alfalfa varieties that were included. The three year (1982-1984) mean annual production for all the varieties was 4047 pounds per acre. The five varieties with the greatest three year mean annual production were Spredor II (4876 lbs/acre), Drylander (4800 lbs/acre), Nugget (4611 lbs/acre), Prowler (4545 lbs/acre) and Ladak 65 (4284 lbs/acre). The standard variety (Vernal) ranked twentieth out of twenty seven varieties with a three year mean annual production of 3841 lbs/acre.

The three year mean production for the pasture type varieties was 4368 lbs/acre. This was 10.2 percent greater than mean production for the hay type varieties which was 3964 lbs/acre (Table 2). The pasture type varieties have had a slightly greater production than the hay type varieties each year of the trial (Table 2).

The alfalfa varieties were separated into three winterhardy categories based on their reported adaptability to survive the winter period. These categories were: very winterhardy, winterhardy, and moderately winterhardy. All of the pasture type alfalfas were very winterhardy. Two of the dryland hay type varieties were very winterhardy, five varieties were moderately winterhardy and twelve hay type varieties were winterhardy. Two varieties were hay and pasture type varieties. One of these hay and pasture type varieties was winterhardy and the other was moderately winterhardy. The three year mean production for the very winterhardy, the winterhardy and the moderately winterhardy categories were 4255, 4050 and 3765 pounds per acre respectively (Table 3). The very winterhardy category had the greatest mean herbage production for each year of this trial. The moderately winterhardy category had the lowest mean herbage production in each year.

All of the varieties in the trial performed satisfactorily under the environmental conditions of southwestern North Dakota during this trial. All of the varieties had three year mean herbage production of greater than 3500 lbs/acre. Four varieties had three year mean production of over 4500 lbs/acre.

Plant density and mean dry weight per plant data were collected in 1983 and 1984 for each variety (Table 4). The five varieties with the greatest number of plants per square foot were Magnum, Ladak 65, 520, 532 and Ranger with 4.99, 4.34, 4.25 and 4.19 plants per foot squared respectively. The five varieties with the lowest plant densities were Polar I, Drylander, Trek, D-111 and Kane with 3.04, 3.38, 3.44, 3.50 and 3.51 plants per foot squared respectively. The five varieties with the greatest mean weight per plant were Drylander, Polar I, Spredor II, D-111 and Perry with 0.65, 0.47, .046, 0.43 and 0.43 ounces per plant respectively. The four varieties with the lowest mean plant weight were Magnum, AS-67, 532 and 520 with 0.25, 0.28, 0.31 and 0.33 ounces per plant respectively. Generally the varieties with the higher plant densities had the lower mean plant dry weights and the varieties with the lower plant densities had the greater mean plant weights.

Plant densities for the pasture type and dryland hay type varieties (Table 5) were 3.71 and 3.84 plants per foot squared respectively. The mean weight per plant for the pasture and hay type varieties were 0.45 and 0.37 ounces respectively. The pasture type alfalfa varieties had a slightly lower plant density per foot squared, a slightly greater mean weight per plant and a slightly greater herbage production per acre than the hay type alfalfa varieties.

The plant densities for the very winterhardy, the winterhardy, and the moderately winterhardy categories were 3.71, 3.77 and 4.08 respectively (Table 6). The mean weight per plant for the very winterhardy, the winterhardy, and the moderately winterhardy categories were 0.43, 0.39 and 0.33 ounces respectively (Table 6). The very winterhardy varieties had the lowest plant density per foot squared, the greatest mean weight per plant and the greatest herbage production per acre. The moderately winterhardy varieties had the greatest plant density, the lowest mean plant weight and the lowest herbage production per acre. The winterhardy varieties were intermediate between the very winterhardy varieties and the moderately winterhardy varieties in plant density, mean plant weight and herbage production per acre.

Most of the varieties in the trial performed very similarly. There was very little actual significant difference between the performance of any of the varieties. Only three varieties have had annual mean herbage production of significant difference from the standard variety (Vernal). Vernal has performed satisfactorily in western North Dakota and any variety selected to be seeded should have tested performance as good or better than Vernal. These plots were established in 1981 and have not been severely stressed by drought conditions nor harsh winter conditions. Southwestern North Dakota is subjected to drought and harsh winter conditions on an irregular basis. These conditions should be considered when selecting alfalfa varieties.

Table 1. Alfalfa Variety Adaptation Trial, Hettinger Experiment Station, 1982-1984

Variety	1982 Clip-7 Jul		1983 Clip-28 Jun		1984 Clip-2 Jul		1982 – 1984 Mean	
	Total Lbs. / Acre[1]	% Vernal	Total Lbs. / Acre[1]	% Vernal	Total Lbs. / Acre[1]	% Vernal	Total Lbs. / Acre	Vernal
Agate	3908 bcd	104	4593 bc	111	3164 bcd	87	3888	101
AS-67	3923 bcd	104	4222 bc	102	2577 cd	71	3574	93
Baker	4550 abcd	121	4025 bc	98	2994 bcd	83	3856	100
D-111	3999 abcd	106	4608 bc	111	3509 abcd	97	4039	105
Drylander	4604 abcd	122	5528 ab	134	4267 ab	118	4800	125
Futura	4752 abcd	126	3323 c	80	3146 bcd	87	3740	97
Iroquois	4782 abcd	127	4474 bc	108	3460 abcd	96	4239	110
Kane	3644 d	97	4246 bc	103	3210 bcd	89	3700	96
Ladak 65	4469 abcd	119	5114 ab	124	3270 abcd	90	4284	112
Magnum	4507 abcd	120	4265 bc	104	2422 d	67	3731	97
Norseman	4406 abcd	117	4069 bc	98	3848 abc	106	4108	107
Nugget	4790 abcd	127	6071 a	147	2971 bcd	82	4611	120
Perry	4478 abcd	119	4313 bc	104	3373 abcd	93	4055	106
Polar I	4603 abcd	122	4447 bc	107	3154 bcd	87	4068	106
Polar II	4016 abcd	107	4036 bc	98	3493 abcd	97	3848	100
Prowler	5244 a	139	5212 ab	126	3178 bcd	88	4545	118
Ramsey	4027 abcd	107	4476 bc	108	2680 cd	74	3728	97
Rangelander	4184 abcd	111	4374 bc	106	3489 abcd	96	4016	105
Ranger	4298 abcd	114	4092 bc	99	3261 abcd	90	3884	101
Spredor II	4986 abc	132	5079 ab	123	4564 a	126	4876	127
Thor	4015 abcd	107	4657 abc	113	3320 abcd	92	3997	104
Travois	5191 ab	138	4109 bc	99	3509 abcd	97	4270	111
Trek	4162 abcd	110	4013 bc	97	2980 bcd	82	3718	97
Vernal	3768 cd	100	4137 bc	100	3619 abcd	100	3841	100
520	4512 abcd	120	4208 bc	102	3385 abcd	94	4035	105
524	4440 abcd	118	4568 bc	110	3373 abcd	93	4127	107
532	3832 cd	102	4165 bc	101	3095 bcd	86	3697	96

[1]Means within columns followed by the same letter are not significantly different by Duncan's multiple range test at $P<0.05$.

Table 2. Mean Herbage Production (Lbs. / Acre) For the Pasture and Dryland Hay Type Alfalfa Varieties at the Hettinger Experiment Station, 1982-1984

Type Alfalfa	1982	1983	1984	Mean
Pasture	4642	4758	3703	4368
Hay	4312	4389	3191	3964
Hay and Pasture	4155	4239	3234	3876

Table 3. Mean Herbage Production (Lbs. / Acre) For the Alfalfa Varieties in Three Winterhardy Categories at the Hettinger Experiment Station, 1982-1984

Winterhardy Category	1982	1983	1984	Mean
Very Winterhardy	4536	4636	3593	4255
Winterhardy	4366	4513	3270	4050
Moderately Winterhardy	4174	4111	3009	3765

Table 4. The Density of Plants and the Mean Dry Weight per Plant, 1983-1984

Varieties	1983			1984			Mean	
	# of Plt. / Ft. sq.	Wt. / Plt. In oz.		# of Plt. / Ft. sq.	Wt. / Plt. In oz.		# of Plt. / Ft. sq.	Wt. / Plt. In oz.
Agate	4.03	0.44		3.28	0.35		3.66	0.40
AS-67	4.40	0.32		3.91	0.24		4.16	0.28
Baker	3.97	0.39		3.91	0.28		3.94	0.34
D-111	3.47	0.50		3.53	0.36		3.50	0.43
Drylander	3.16	0.75		3.60	0.55		3.38	0.65
Futura	3.66	0.34		3.41	0.33		3.54	0.34
Iroquois	4.16	0.40		3.60	0.35		3.88	0.38
Kane	3.23	0.49		3.78	0.31		3.51	0.40
Ladak 65	4.28	0.44		4.40	0.27		4.34	0.36
Magnum	5.14	0.32		4.84	0.18		4.99	0.25
Norseman	3.04	0.49		4.03	0.35		3.54	0.42
Nugget	4.77	0.47		3.16	0.34		3.97	0.41
Perry	2.91	0.58		4.46	0.28		3.69	0.43
Polar I	2.91	0.57		3.16	0.36		3.04	0.47
Polar II	4.09	0.38		3.78	0.34		3.94	0.36
Prowler	4.16	0.46		3.41	0.34		3.79	0.40
Ramsey	3.97	0.42		3.84	0.25		3.91	0.34
Rangelander	4.34	0.37		2.73	0.47		3.54	0.42
Ranger	4.46	0.37		3.91	0.30		4.19	0.34
Spredor II	3.91	0.48		3.78	0.44		3.85	0.46
Thor	3.53	0.51		3.66	0.33		3.60	0.42
Travois	4.34	0.36		3.97	0.32		4.16	0.34
Trek	3.16	0.48		3.72	0.29		3.44	0.39
Vernal	3.28	0.48		3.81	0.34		3.55	0.41
520	4.59	0.33		3.91	0.32		4.25	0.33
524	3.53	0.48		3.53	0.35		3.53	0.42
532	4.46	0.34		4.03	0.28		4.25	0.31

Table 5. Mean Density of Plants and the Mean Dry Weight per Plant for the Pasture and Dryland Hay Type Alfalfa Varieties at the Hettinger Experiment Station, 1983-1984

Type Alfalfa	1983			1984			Mean	
	Mean # of Plt. / Ft. sq.	Mean Wt. / Plt. In oz.		Mean # of Plt. / Ft. sq.	Mean Wt. / Plt. In oz.		Mean # of Plt. / Ft. sq.	Mean Wt. / Plt. In oz.
Pasture	3.86	0.49		3.55	0.41		3.71	0.45
Hay	3.92	0.43		3.76	0.31		3.84	0.37
Hay and Pasture	3.69	0.46		4.25	0.28		3.97	0.37

Table 6. Mean Density of Plants and the Mean Dry Weight per Plant for the Alfalfa Varieties In Three Winterhardy Categories at the Hettinger Experiment Station, 1983-1984

Winterhardy Category	1983			1984			Mean	
	Mean # of Plt. / Ft. sq.	Mean Wt./ Plt. In oz.		Mean # of Plt. / Ft. sq.	Mean Wt. / Plt. In oz.		Mean # of Plt. / Ft. sq.	Mean Wt. / Plt. In oz.
Very Winterhardy	3.77	0.48		3.64	0.38		3.71	0.43
Winterhardy	3.81	0.46		3.72	0.32		3.77	0.39
Moderately Winterhardy	4.21	0.37		3.94	0.28		4.08	0.33