ALFALFA VARIETY TRIAL – 1983

Dickinson Experiment Station

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An Alfalfa Variety Trial, seeded at the Dickinson Experiment Station in May, 1979, was designed to evaluate the performance of 21 varieties in western North Dakota. Four pasture types, sixteen dry land hay types and one hay and pasture type alfalfa varieties were included in the trial. One cutting in late June or early July has been made annually since 1980.

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 1983 were: 520, Kane, 524, Baker and D-111 with 6342, 6135, 5896, 5865 and 5442 pounds of herbage production per acre 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 four year (1980-1983) mean annual production for all the varieties was 2861 pounds per acre. The five varieties with the greatest four year mean annual production were: Kane (3583 lbs/acre), 520 (3070 lbs/acre), Rangelander (3008 lbs/acre), Ladak 65 (2991 lbs/acre) and 524 (2969 lbs/acre). The two varieties with the lowest four year mean annual production were: Agate (2369 lbs/acre) and Iroquois (2590 lbs/acre). The standard variety (Vernal) ranked fourteenth out of twenty-one varieties with a four year mean annual production of 2802 lbs/acre.

The four year average production for the pasture type varieties was 3078 lbs/acre. This was 9.3 percent greater than the average production for the hay type varieties, which was 2817 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 winter hardy categories based on their reported adaptability to survive the winter period. These categories were: very winter hardy, winter hardy, and moderately winter hardy. All of the pasture type alfalfas were very winter hardy. Three of the dry land hay type varieties were very winter hardy, one variety was moderately winter hardy and the remainder of the hay types were winter hardy. The four year average production for the very winter hardy, the winter hardy, and the moderately winter hardy categories were: 2953, 2817, and 2665 pounds per acre respectively (Table 3). The very winter hardy category had the greatest herbage production in 1980, 1982 and the four year mean. The winter hardy category had the greatest herbage production in 1983. The moderately winter hardy category had the greatest production in 1981, but it has had the lowest production in 1980, 1982, 1983 and the four year mean (Table 3).

Plant density and mean dry weight per plant data were collected in 1983 for each variety (Table 4). The six varieties with the greatest number of plants per square foot were: Anik, Kane, Rangelander, Travois, Norseman, and Spredor II with 4.90, 4.21, 4.21, 4.16, 4.12 and 4.03 plants per foot squared respectively. The four varieties with the lowest plant densities were: Trek, Nugget, Polar I, and 520 with 2.95, 3.07, 3.07 and 3.10 plants per foot squared respectively. The five varieties with the greatest mean weight per plant were: 520, Polar I, Trek, Baker, and D-111 with 0.80, 0.65, 0.65, 0.59 and 0.59 ounces per plant respectively. The four varieties with the lowest mean plant weight were: Norseman, Anik, Rangelander and Agate with 0.40, 0.41, 0.42 and 0.43 ounces per plant respectively. Generally the varieties with the higher plant densities had the lower mean plant weights and the varieties with the lower plant densities had the greater mean plant weight.

Plant densities for the pasture type and dry land hay type varieties (Table 5) were 4.15 and 3.45 plants per foot squared respectively. The mean weight per plant for the pasture and hay type varieties were 0.46 and 0.56 ounces respectively (Table 5). The pasture type alfalfa varieties had a greater plant density per foot squared, a lower mean weight per plant and a slightly greater herbage production per acre than the hay type alfalfa varieties.

The plant densities for the very winter hardy, the winter hardy, and the moderately winter hardy categories were: 4.10, 3.35 and 3.75 plants per foot squared respectively (Table 5). The mean weight per plant for the very winter hardy, the winter hardy, and the moderately winter hardy categories were: 0.46, 0.58 and 0.48 ounces respectively (Table 5). The very winter hardy varieties had a greater density per foot squared, a lower mean weight per plant and a slightly lower herbage production per acre than the winter hardy category. The moderately winter hardy category had intermediate plant density and mean plant weight between the very winter hardy and the winter hardy categories and had lower herbage production per acre than the other two categories.

Most of the varieties in the trial performed satisfactorily under the environmental conditions of western North Dakota. Thirteen of the twenty-one varieties had greater four year mean annual herbage production than the standard variety (Vernal). Nineteen varieties had four year mean annual herbage production of over 2600 lbs/acre. Three varieties had mean annual production of over 3000 lbs/acre. Two of these varieties were pasture types and the other was a hay type variety.

Most of the varieties have had very good herbage production during the 1982 and 1983 growing seasons. Nineteen varieties have two year mean annual herbage production of over 4400 lbs/acre, twelve varieties have over 4800 lbs/acre, four varieties have over 5000 lbs/acre and one variety has over 6000 lbs/acre. Fourteen varieties had two year annual herbage production greater than the standard variety (Vernal). The six varieties with the greatest two year (1982-1983) mean annual herbage production were: Kane, 520, Ladak 65, 524, Rangelander and Ramsey with 6137, 5308, 5109, 5009, 4996 and 4996 pounds per acre respectively.

Table 1. Alfalfa Variety Trial - 1983[1]

Variety	1980 Clip – 27 Jun		1981 Clip – 23 Jun		1982 Clip – 2 Jul		1983 Clip – 1 Jul		1980 – 1983 Mean	
	Total Lbs. / Acre	% Vernal	Total Lbs. / Acre	% Vernal	Total Lbs. / Acre	% Vernal	Total Lbs. / Acre	% Vernal	Total Lbs. / Acre	% Vernal
Agate	329abcd	88	1401cdef	89	3832e	86	3912c	81	2369	85
Anik	171f	46	1978a	126	4563bcde	103	4459bc	92	2793	100
Baker	233def	63	1662bc	106	4011de	91	5865ab	121	2943	105
D-111	295bcdef	79	1747ab	111	3944de	89	5442abc	113	2857	102
Iroquois	401ab	108	1422bcdef	90	4794bcde	108	3744c	77	2590	92
Kane	402ab	108	1655bcd	105	6139a	139	6135ab	126	3583	128
Ladak	320abcd	86	1351cdef	86	4796bcde	108	4414bc	91	2720	97
Ladak-65	337abcd	91	1407bcdef	90	4785bcde	108	5433abc	112	2991	107
Norseman	445a	120	1556bcde	99	5210b	118	4495bc	93	2927	104
Nugget	374abc	101	1391bcdef	88	4558bcde	103	4338bc	90	2665	95
Polar I	244cdef	66	1519bcdef	97	4695bcde	106	5277abc	109	2934	105
Ramsey	307bcd	83	1195f	76	4804bcde	108	5187abc	107	2873	103
Rangelander	400ab	108	1642bcd	104	4981bcd	112	5010abc	104	3008	107
Ranger	403ab	108	1239ef	79	4455bcde	101	5243abc	108	2835	101
Spredor II	369abc	99	1289cdef	82	5260b	119	4575abc	95	2873	103
Thor	284bcdef	76	1554bcde	99	4158cde	94	4662abc	96	2665	95
Travois	372abc	100	1277def	81	5077bc	115	4659abc	96	2846	102
Trek	335abcd	90	1362cdef	87	4282bcde	97	5124abc	106	2776	99
Vernal	372abc	100	1572bcdef	100	4425bcde	100	4838abc	100	2802	100
520	180ef	48	1485bcdef	94	4274bcde	96	6342a	131	3070	110
524	339abcd	91	1518bcdef	97	4121cde	93	5896ab	122	2969	106

[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 Dry land Hay Type Alfalfa Varieties, 1980-1983

Type Alfalfa	1980	1981	1982	1983	Mean
Pasture	386	1466	5364	5095	3078
Hay	345	1461	4447	5013	2817
Hay & Pasture	171	1978	4563	4459	2793

Table 3. Mean Herbage Production (Lbs/Acre) for the Alfalfa Variety in Three Winter Hardy Categories, 1980-1983

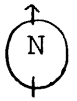
Winter Hardy Category	1980	1981	1982	1983	Mean
Very Winter Hardy	348	1493	5104	4867	2953
Winter Hardy	320	1477	4348	5121	2817
Moderately Winter Hardy	284	1554	4158	4662	2665

Table 4. The Density of Plants and the Mean Dry Weight per Plant – 1983

Varieties	Number of Plants Per Foot Squared	Weight Per Plant In Ounces
Agate	3.81	0.43
Anik	4.90	0.41
Baker	3.63	0.59
D-111	3.04	0.59
Iroquois	3.28	0.57
Kane	4.21	0.48
Ladak	3.26	0.57
Ladak-65	3.88	0.50
Norseman	4.12	0.40
Nugget	3.07	0.55
Polar I	3.07	0.65
Ramsey	3.91	0.48
Rangelander	4.21	0.42
Ranger	3.35	0.53
Spredor II	4.03	0.47
Thor	3.75	0.48
Travois	4.16	0.46
Trek	2.95	0.65
Vernal	3.35	0.55
520	3.10	0.80
524	3.63	0.55

Table 5. Mean Density of Plants and the Mean Dry Weight per Plant for the Pasture and Hay Type Alfalfa Variety and for the Three Winter Hardy Categories, 1983

Type Alfalfa	Mean Number of Plants Per Foot Squared	Mean Weight Per Plant In Ounces
Type Alfalfa:		
Pasture	4.15	0.46
Hay	3.45	0.56
Hay & Pasture	4.90	0.41
Winter Hardy Category:		
Very Winter Hardy	4.10	0.46
Winter Hardy	3.35	0.58
Moderately Winter Hardy	3.75	0.48



Rep 1		Rep 2		Rep 3	
1 Ladak 65	6 Travois	1 Control	6 Spredor 2	1 Vernal	6 Prowler
2 Prowler	7 Control	2 Ladak 65	7 Travois	2 Travois	7 Anik
3 Rangelander	8 Kane	3 Drylander	8 Rangelander	3 Spredor 2	8 Drylander
4 Anik	9 Spredor 2	4 Vernal	9 Prowler	4 Ladak 65	9 Rangelander
5 Vernal	10 Drylander	5 Kane	10 Anik	5 Control	10 Kane

Figure 4. Alfalfa variety broadcast seeding trial, seeded 29 Apr 1983.

Figure 3. Interseeded alfalfa variety response to grazing, seeded 27-28 Apr 1983.