

1996 NORTH DAKOTA ALFALFA PERFORMANCE TESTS

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The 1995-1996 winter was relatively cold with below-normal average temperatures from October 1995 to March 1996. November, January, and March were greater than 7.0 F below normal. Snow cover was in excess of 4 inches from December 12, to March 6. Loss of snow cover in mid March and a new snowstorm and cold temperatures in late March and early April caused some of the worst winter kill to alfalfa stands in the area in 25 years.

Forage yield data for alfalfa cultivars and experimental lines tested in North Dakota are presented in the next six tables. Insect pressure generally was not a significant yield factor; a little leafhopper damage was noted in the third harvest at Fargo, but was not considered worth treating. Anthracnose infection was not a problem in 1996 unlike the last two years. Rhizoctonia crown rot was detected in the third harvest but caused little damage.

Weed-free forage yields at Fargo were reduced by winter injury, which caused a significant increase in the coefficient of variation (CV) in these experiments. The 4-cut system in the 1993 seeding had very poor stands ranging from 22 to 58%. The

3-cut system was injured, but still had above-normal forage yields for a 3-year-old stand. The 4-cut system in the 1995 seeding was injured more than the 3-cut system, but mean forage yields were only slightly less. Stands in the 1996 seeding are excellent, but forage yields were low due to the below-normal precipitation in June and July.

Irrigated forage yields at Carrington were also reduced by winter injury/kill. One 3-cut replicate in the 1995 seeding was deleted due to spotty winter kill. Forage yields were slightly less from the 4 than 3-cut system, both were less than normal. Complete winter kill of the 1991 and 1993 seedings occurred with no differences between the 3 and 4-

cut systems or cultivars in the 1993 seedings.

The 1996 North Dakota alfalfa hay crop was estimated at 2.34 million tons, 76% of 1995 production, but the North Dakota Agricultural Statistic Service. Yield per acre at 1.8 tons is equal to the previous 5-year average. Alfalfa acreage harvested was estimated at 1.3 million acres, 93% of 1995. Cultivars that yield equal or greater than Vernal are recommended for hay production in North Dakota.

North Dakota Agricultural Experiment Station; Fargo, ND; 1993 dryland									
Entry	1996 harvest dates				1996 Total	94-96 Total	Relative yield $\frac{29}{11}$		Stand 11-1 ---%---
	3-cut:	6-19	7-16	8-19			10-2	1996	
		4-cut:	6-12	7-10	8-13	-----Tons dry matter/acre-----		--% of Vernal---	
3-cut system									
Clipper	2.01	1.18	1.21		4.40	14.79	90	96	62
Legen Dairy	2.10	1.20	1.29		4.59	15.12	93	98	60
MS-91	2.26	1.24	1.23		4.73	14.95	96	97	62
WL 323	1.78	1.21	1.16		4.15	14.95	85	97	58
WL 323 HQ	1.98	1.36	1.13		4.47	14.66	91	95	65
Vernal	2.30	1.34	1.26		4.90	15.30	100	99	65
Vernal	2.35	1.32	1.24		4.91	15.64	100	101	65
5246	1.80	1.07	1.10		4.06	15.02	83	97	50
5262	2.12	1.15	1.14		4.41	15.58	90	101	62

5364	1.98	1.20	1.32		4.50	15.32	92	99	62
Mean	2.07	1.23	1.22		4.51	15.13	92	98	61
LSD (0.05)	NS	NS	NS		0.48		10		9
CV(%)	13.4	10.0	11.4		6.2		6.2		8.8
4-cut system									
Clipper	0.89	1.11	0.95	0.79	3.74	14.78	90	97	35
Legen Dairy	1.16	0.97	0.91	0.80	3.84	14.78	92	97	40
MS-91	0.96	0.85	0.86	0.60	3.27	13.37	79	87	40
WL 323	0.94	0.85	0.77	0.56	3.12	14.20	75	93	37
WL 323 HQ	1.35	0.87	0.77	0.56	3.55	14.65	85	96	45
Vernal	1.75	1.13	1.11	0.78	4.77	16.12	115	105	58
Vernal	1.20	0.89	0.88	0.58	3.55	14.50	85	95	45
5246	0.52	0.72	0.76	0.60	2.60	14.36	63	94	22
5262	1.23	1.19	1.17	0.76	4.35	16.11	105	105	48
5364	1.42	1.02	1.02	0.74	4.20	16.01	101	105	45
Mean	1.13	0.94	0.90	0.67	3.63	14.89	87	97	41
LSD (0.05)	NS	NS	NS	NS	NS		NS		NS
CV (%)	41.2	26.7	21.5	24.7	28.0		28.0		32.6

Design: Splitplot, cut = mainplot Plot size: 5 by 18 feet
 Seeding method: Broadcast Replicates: Three
 Seeding rate: 15 lb PLS/acre Harvest plot: 34 in. By 13 ft.
 Seeding date: May 4, 1993 Cuttings: 1993 (0), 94-96 (3-4)
 Herbicide: Pursuit @ 2 oz/acre in 1993 Soil type: Fargo clay
 Fertilization: 50 lb P & 100 lb K/acre/year Insecticide: None
 Seed supplied by originator except Vernal
 Vernal averaged 4.91 and 4.16 tons/acre in 1996 and 15.47 and 15.31 tons/acre in 1994-96 for the 3 and 4-cut systems, respectively.

North Dakota Agricultural Experiment Station; Fargo, ND; 1995 dryland

Entry	1996 harvest dates					Total	Relative yield ^{2/3}		Stand 11-1 ---%---
	3-cut:	6-13	7-12	8-15	10-21		1995	1996	
	4-cut:	6-11	7-09	8-11			---% of Vernal---		
		-----Tons dry matter/acre-----							
3-cut system									
3452-ML	1.64	1.09	1.12		3.85	98	90	73	
5262	1.77	1.28	1.11		4.16	95	97	80	
5454	1.83	1.25	1.15		4.23	96	99	80	
ABT 205	1.54	1.19	1.21		3.94	99	92	70	
ABT 405	1.55	1.06	1.16		3.77	101	88	72	
Defiant	2.07	1.37	1.19		4.63	94	108	82	

DK 127	1.78	1.30	1.31		4.39	99	103	78
Haygrazer	1.54	1.14	1.27		3.95	99	92	67
Proof	1.61	1.22	1.23		4.06	102	95	72
Rushmore	1.92	1.26	1.21		4.39	101	103	76
Sterling	1.98	1.28	1.17		4.43	92	104	82
Vernal	1.94	1.20	1.13		4.27	98	100	77
Vernal (Foun.)	1.92	1.22	1.16		4.30	101	100	77
WL 252 HQ	1.60	1.29	1.29		4.18	99	98	75
Mean	1.76	1.22	1.20		4.18	98	98	76
LSD (0.05)	NS	0.19	0.11		NS	5.5	NS	NS
CV (%)	16.0	8.3	5.3		8.3	3.3	83	10.1
4-cut system								
3452-ML	1.61	0.92	1.01	0.62	4.16	99	112	75
5262	1.28	0.75	0.90	0.55	3.48	95	95	73
5454	1.42	0.84	0.93	0.59	3.78	96	102	68
ABT 205	1.65	0.81	0.88	0.53	3.87	102	104	78
ABT 405	1.28	0.78	0.91	0.55	3.52	101	95	67
Defiant	1.67	0.85	0.95	0.63	4.10	96	111	73
DK 127	1.64	0.94	0.89	0.60	4.07	103	110	75

Haygrazer	1.45	0.87	0.86	0.64	3.82	105	103	72
Proof	1.68	0.93	0.90	0.60	4.11	109	111	77
Rushmore	1.57	0.84	0.93	0.66	4.00	104	108	73
Sterling	1.45	0.84	0.89	0.61	3.79	104	102	73
Vernal	1.41	0.80	0.87	0.53	3.61	100	97	68
Vernal (Foun.)	1.57	0.80	0.87	0.56	3.80	100	102	75
WL 252 HQ	1.23	0.84	0.95	0.67	3.69	109	99	70
Mean	1.49	0.84	0.91	0.59	3.84	102	104	73
LSD (0.05)	NS	NS	NS	NS	NS	8.3	NS	NS
CV (%)	17.1	11.9	13.2	10.3	11.4	4.9	11.4	8.1

Design: Splitplot, cust = mainplot Plot size: 5 by 18 feet Seeding method: Broadcast
Replicates: Three Seeding rate: 25 lb/acre Harvest plot: 34 in. By 13 ft.
Seeding date: May 5, 1995 Cuttings: 1995 (2/3), 1996 (3/4) Herbicides:None
Soil type: Fargo clay Fertilization: 50P & 100K lb/acre Insecticide: None
Seed obtained from Dan Undersander, University of Wisconsin
²¹Relative yield is expressed as percentage of Vernal and Vernal (Foun.) Mean, which averaged 4.28 and 3.71 tons/acre for the 3 and 4-cut systems respectively.

North Dakota Agricultural Experiment Station; Carrington, ND; 1995 irrigated.						
	3-cut:	1996 harvest dates			Relative yield ²¹	Stand


Entry	4-cut:	6-21	7-23	8-23	10-28	Total			10-28 ---%---
		6-17	7-16	8-20			1995	1996	
		Tons dry matter/acre				--% of Vernal---			
3-cut system									
2555-ML		2.33	1.43	1.18		4.94	103	102	80
5262		2.34	1.25	1.18		4.77	110	99	82
5454		2.20	1.48	1.20		4.88	106	101	80
ABT 205		2.33	1.54	1.21		5.08	96	105	85
ABT 405		2.46	1.39	1.20		5.05	103	104	80
DK 127		2.47	1.29	1.30		5.06	96	105	82
Paramount		2.11	1.55	1.15		4.81	104	99	85
Proof		2.12	1.62	1.24		4.98	105	103	82
Vernal		2.08	1.34	1.19		4.61	99	95	80
Vernal (Foun.)		2.51	1.45	1.11		5.07	101	105	80
Viking I		2.42	1.43	1.32		5.17	100	107	82
WL 252 HQ		2.01	1.77	1.24		5.02	99	104	80
WL 323		2.25	1.17	1.16		4.58	100	95	82
Mean		2.28	1.44	1.20		4.92	102	102	82
LSD (0.05)		NS	0.23	NS		NS	NS	NS	NS

CV (%)	9.5	7.5	8.3		6.0	5.7	6.0	2.2
4-cut system								
2555-ML	1.81	1.24	1.20	0.37	4.62	111	95	85
5262	1.87	1.38	1.33	0.40	4.98	107	103	87
5454	1.83	1.25	1.21	0.39	4.68	105	96	87
ABT 205	1.84	1.29	1.10	0.45	4.68	102	96	80
ABT 405	1.73	1.48	1.23	0.40	4.84	109	100	85
DK 127	1.79	1.15	1.22	0.40	4.56	103	94	85
Paramount	1.61	1.23	1.15	0.34	4.33	110	89	82
Proof	2.10	1.22	1.15	0.32	4.79	107	99	85
Vernal	1.83	1.31	1.03	0.39	4.56	97	94	85
Vernal (Foun.)	2.09	1.48	1.16	0.42	5.15	103	106	82
Viking I	1.77	1.40	1.01	0.50	4.68	105	96	80
WL 252 HQ	1.80	1.16	1.04	0.44	4.44	109	92	80
WL 323	1.76	1.23	0.94	0.44	4.37	105	90	85
Mean	1.83	1.29	1.14	0.41	4.67	106	96	84
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS
CV (%)	11.1	11.4	11.0	16.5	6.9	4.8	6.9	4.1

Design: Splitplot, cut = mainplot Plot size: 5 by 18 feet
 Seeding method: Broadcast Replicates: Two, one deleted
 Seeding rate: 25 lb/acre Harvest plot: 34 in. By 13 ft.
 Seeding date: May 17, 1995 Cuttings: 1995 (2/3), 1996 (3/4) Herbicide: None Soil type: Kief loam
 Fertilization: 50P & 100K/acre Insecticide: None
 Seed obtained from Dan Undersander, University of Wisconsin
 Vernal and Vernal (Foun.) Averaged 2.54 and 3.18 tons/acre in 1995 and 4.84 and 4.85 tons/acre in 1996 for the 3 and 4-cut systems respectively. Replicate 1 was deleted from reported data for 3-cut system due to spot winter kill.

North Dakota Agricultural Experiment Station; Fargo, ND; 1996 dryland					
Entry	1996			Relative Yield	Stand 11-1 ---%---
	7-29	10-22	Total		
	Tons dry matter/acre			--% of Vernal-	
1-cut system					
Avalanche + Z	1.17		1.17	93	89
Big Horn	1.14		1.14	90	87
Depend + EV	1.19		1.19	94	91
DK 127	1.11		1.11	88	89
Imperial	1.23		1.23	98	91
Rainier	1.14		1.14	90	91
Vernal	1.18		1.18	94	86

Vernal	1.35		1.35	107	89
WL 324	1.29		1.29	102	89
WL 325 HQ	1.18		1.18	94	91
5312	1.08		1.08	86	89
5454	1.20		1.20	95	92
Mean	1.19		1.19	94	89
LSD (0.05)	0.14		0.14	11	NS
CV (%)	8.4		8.4	8.4	3.6
2-cut system					
Avalanche + Z	1.14	0.59	1.73	101	90
Big Horn	1.19	0.64	1.83	107	91
Depend + EV	1.19	0.65	1.84	108	92
DK 127	1.17	0.64	1.81	106	94
Imperial	1.14	0.70	1.84	108	90
Innovator + Z	1.14	0.63	1.77	104	87
Rainier	1.06	0.63	1.69	99	94
Vernal	1.13	0.55	1.68	98	89
Vernal	1.14	0.60	1.74	102	89

WL 324	1.16	0.67	1.83	107	92
WL 325 HQ	1.10	0.65	1.75	102	91
5312	1.17	0.61	1.78	104	94
5454	1.11	0.61	1.72	101	90
Mean	1.14	0.63	1.77	104	91
LSD (0.05)	NS	NS	NS	NS	4
CV (%)	12.1	9.4	8.6	8.6	3.1
<p>Design: Splitplot, cust = mainplot Plot size: 3 by 18 feet Seeding method: Broadcast Replicates: Four</p> <p>Seeding rate: 25 lb/acre Harvest plot: 3 by 13 ft.</p> <p>Seeding date: May 13, 1996 Cuttings: 1996 (1/2)</p> <p>Herbicide: Pursuit @ 3 oz/acre Soil type: Fargo clay</p> <p>Fertilization: None Insecticide: None</p> <p>Seed obtained from Dan Undersander, University of Wisconsin</p> <p> Relative yield is percent of Vernal, which averaged 1.26 and 1.71 tons/acre for the 1 and 2-cut systems, respectively.</p>					

Alfalfa Varietal Trial and Mandan, ND from 1994 to 1996					
Entry	7-8-96	7-27-95	7-6-94	3-year Total	Relative Yield
	Tons Dry Matter/Acre				%
Released Cultivars					
Pioneer 5151	3.09	2.20	2.32	7.61	110

Roamer	3.04	1.99	2.53	7.56	109
Ladak 65	2.87	2.22	2.30	7.39	107
Drylander	2.90	1.97	2.42	7.29	105
Vernal	2.67	2.02	2.29	6.98	101
Travois	2.74	1.65	2.52	6.91	100
Rangelander	2.46	2.17	2.23	6.86	99
Heinrichs	2.44	1.86	2.32	6.62	96
Rambler	2.53	1.81	2.12	6.46	93
Spredor 3	2.37	1.79	2.14	6.30	91
Anik	2.17	1.28	2.37	5.82	84
Experimental Strains					
Mandan 1801	2.99	1.82	2.49	7.30	105
Mean	2.69	1.90	2.34	6.93	100
5% LSD	0.40	0.29	NS	0.68	---
CV (%)	10.4	10.5	10.5	11.9	---
MCV (%)	14.8	15.2	---	9.8	---

Location: Mandan, North Dakota Plot size: 9' by 20' (60 ft² harvested)

Design: Randomized complete block Soil type: Morton sandy loam
 Seeding method: Drilled in 3' rows Replicates: Four
 Seeding Date: May 25, 1993 Cuttings: 1 annually
 Herbicide: Pursuit (June 12, 1996) Cooperator: John Berdahl

North Central Research and Extension Center; Minot, ND; 1995 dryland						
Entry	1996			1995	Relative Yield	
	6-14	7-24	Total		1996	1995
	Tons Dry Matter/Acre				% of Vernal	
DK 127	1.25	1.22	2.46	2.04	85	117
LegenDairy	1.33	1.37	2.70	1.88	94	108
Proof	1.43	1.53	2.96	1.72	103	99
Spredor 3	1.55	1.34	2.89	1.67	100	96
Sterling	1.46	1.45	2.90	2.02	101	116
Vernal	1.51	1.37	2.88	1.74	100	100
WL 252 HQ	1.23	1.22	2.44	1.93	85	111
2555-ML	1.38	1.42	2.79	1.97	97	113
5262	1.20	1.25	2.45	2.03	85	117
5454	1.32	1.48	2.80	2.04	97	117

Mean	1.36	1.36	2.73	1.90	95	109
LSD (0.05)	NS	NS	NS	0.27	NS	16
CV (%)	14.2	14.7	12.1	9.8	12.1	9.8

Design: Randomized complete block Plot size: 4' by 24'
 Seeding method: Drilled in 6" rows Soil type: Williams loam
 Seeding Date: May 18, 1995 Replicates: Four
 Cuttings: 1 annually Herbicide: None
 Fertilization: None Insecticide: None
 Cooperator: Mark Zarnstorff
 Seed obtained from Dr. Dan Undersander at University of Wisconsin.

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