Department of Plant Sciences and Plant Pathology
410 Leon Johnson Hall
Montana State University - Bozeman
P.O. Box 173140
Bozeman, MT 59717-3140
406-994-5058 (FAX--1848)
e-mail RLD@montana.edu

MEMORANDUM

DATE: December 28, 2004

TO: Alfalfa Variety Release Committee

FROM: Ray Ditterline

RE: Recommendation for MT9321

Motion: That MT9321 be approved for release as a public variety by MAES.
Motion: That MT9321 be named 'Melton'.
Motion: That MT9321 be recommended for dryland and irrigated conditions statewide

The Montana Alfalfa Seed Committee has asked that MT9321 be released as a public variety. The Foundation Seed program has agreed to collect a royalty on the variety. The royalty will be used to supplement the Robert F. Eslick graduate student award fund.

Potential name: The name **Melton** is suggested to honor Dr. Bill Melton, the alfalfa breeder at New Mexico State University (NMSU) for 32 years. He released 7 cultivars and 6 germplasms (his first passion). Melton's varieties were quickly accepted by the growers and most of the alfalfa acreage was planted to land grant university varieties. During his tenure, alfalfa developed into the most important cash crop in New Mexico. Perhaps his greatest accomplishment was in mentoring students. He served as major professor to over 50 M.S. and Ph.D. students and was very proud that his students comprised 60 - 70% of the commercial alfalfa breeders in the U.S.. He received NMSU's Distinguished Research Award, Distinguished Graduate Teaching Award and was elected to Fellow in both (ASA and CSSA) societies. Bill Melton died of a heart attack in 2001, while flying a remote control model airplane (his second passion).

MT9321 was tested in the trials from which 'Shaw' and 'Cooper' were released, however we had problems getting the seed increased. I truly want to thank the folks at Sidney growing the Syn. 2 generation for us.

Variety Description:

1. MT9321 is a 120-clone synthetic variety selected for color, vigor and seed yield in a spaced-planted nursery. Phenotypic recurrent selection was used to select plants for resistance to Phytophthora and Verticillium wilt. Parents include 60 clones selected from 'Shaw' and 60 clones from 'Spredor II'.

2. MT9321 is intended for use as hay, haylage, greenchop, or dehy production.

3. MT9321 is a fall dormancy 3 variety. Fall dormancy is similar to 5246 and Ranger. Flower color is 84% purple, 16% variegated and a trace of white, yellow and cream.

4. MT9321 has high resistance to Phytophthora root rot and Northern root-knot nematode, resistance to Verticillium wilt, fusarium wilt, bacterial wilt, aphanomyces (race 1) root rot alfalfa stem nematode, pea aphid, and and moderate resistance to spotted alfalfa aphid.

5. Seed increases is on a limited generation basis with one generation of breeder and two generations of foundation and certified seed classes. Breeders (Syn. 1), Foundation (Syn. 2 or 3) and Certified (Syn. 3 or Syn. 4) classes will be recognized. Breeder seed was produced under open-pollinated field conditions at Manhattan, MT. Syn. 2 seed is being produced at Sidney, MT. and sufficient seed for the life of the variety will be produced and maintained by MSU.

6. Certified seed will be marketed in 200?

Performance Data: MT9321 was planted in 1996 and tested for yield and adaptation in 1997 - 1999. MT9321 was tested at five locations (Bozeman-irrigated, Kalispell- irrigated and dryland, Sidney-irrigated, and Moccasin-dryland). MT9321 yielded 102% of the statewide irrigated average and 103% of the statewide dryland average. Ladak 65, Wrangler, Oneida VR, and Riley were the fall dormancy 1, 2, 3 and 4 check cultivars, respectively.

Pest Resistance Data: The USDA/ARS used to provide pest data for experimental's as a service. This service has greatly declined, with increased emphasis on publications. Crop Characteristics, Inc. from Farmington, MN has developed a business out of testing alfalfa cultivars for pest resistance. Alfalfa is a cross-pollinated crop with each plant genetically different from every other plant. It is not possible to "fix" resistance in alfalfa like it is with self-pollinated crops.

National Pest Resistance Standards:	**% Resistant plants**	**Resistance class**
	0 - 5	Susceptible
	6 - 14	Low Resistance
	15 - 30	Moderate Resistance
	31 - 50	Resistance
	>50	High Resistance

MT9321 Pest Resistance

Disease	Class	% Res Plts
Phytophthora Root Rot	HR	60.3
Verticillium Wilt	R	49.8
Fusarium Wilt	R	45.9
Bacterial Wilt	R	36.7
Aphanomyces (race 1)	R	32.0
Insects		
Pea Aphid	R	41.0
Spotted Alfalfa Aphid	MR	17.9
Nematodes		
Northern Root-Knot	HR	55.1
Stem Nematode	R	39.1

Table 31. Historical statewide summary of alfalfa variety trials in Montana - trials planted in **1996**, and harvested in 1997, 1998 and 1999.

(Yield in tons of dry matter/acre per year).

Location:	Bozeman	Kalispell	Kalispell	Moccasin	Sidney	Statewide Average			
Irrigated/Dry:	I	I	D	D	I	I	I %Mean	D	D %Mean
Hyland	6.36	4.59	5.99	2.11	5.90	5.62	106	2.11	100
Oasis 371	6.23	4.37	5.71	2.13	6.13	5.58	105	2.13	101
Ultra	6.26	4.46	5.57	2.12	5.92	5.55	104	2.12	101
MagnaGraze	6.17	4.26	6.14	1.99	6.16	5.53	104	1.99	95
Bighorn	6.42	4.15	5.83	2.12	5.91	5.49	103	2.12	101
5396	6.26	4.16	6.51	1.98	6.05	5.49	103	1.98	94
Ranier	5.95	4.41	6.06	2.03	6.01	5.46	103	2.03	97
5454	6.31	4.22	6.16	2.00	5.78	5.44	102	2.00	95
WL 325 HQ	6.16	4.38	5.77	2.07	5.75	5.43	102	2.07	99
Wrangler	6.09	4.48	5.56	1.99	5.71	5.43	102	1.99	95
Magnum III	6.21	4.32	5.84	2.16	5.70	5.41	102	2.16	103
329	6.09	4.29	5.26	2.05	5.82	5.40	102	2.05	98
WL 324	6.32	4.16	6.09	2.32	5.71	5.40	102	2.32	110
MT 9321	6.12	4.09	5.56	2.17	5.96	5.39	102	2.17	103
Excalibur II	6.22	4.08	5.67	2.12	5.85	5.38	101	2.12	101
MT 9503	6.13	4.06	5.83	2.11	5.80	5.33	100	2.11	100
Shaw	6.04	4.05	5.27	2.25	5.88	5.32	100	2.25	107
LegenDairy 2.0	6.01	4.15	5.30	2.16	5.76	5.31	100	2.16	103
Oneida VR	6.02	4.40	5.60	2.12	5.38	5.27	99	2.12	101
Affinity +Z	5.97	3.84	5.59	2.12	5.91	5.24	99	2.12	101
MT 9310	5.90	3.97	5.54	2.06	5.77	5.21	98	2.06	98
MT 9304	5.78	3.84	5.52	2.19	5.85	5.16	97	2.19	104
MT 9316	5.95	3.71	5.53	2.08	5.79	5.15	97	2.08	99
MT 9306	5.95	3.69	5.30	2.13	5.78	5.14	97	2.13	101
MT 9308	5.99	3.83	5.39	2.04	5.60	5.14	97	2.04	97
MT 9309	5.94	3.55	5.31	2.10	5.89	5.13	97	2.10	100
MT 9302	5.88	3.53	5.23	2.09	5.65	5.02	95	2.09	100
MT 9303	5.58	3.82	4.74	2.16	5.51	4.97	94	2.16	103
Ladak 65	5.61	3.64	5.19	2.06	5.58	4.94	93	2.06	98
Riley	5.60	3.64	5.43	1.91	5.55	4.93	93	1.91	91
Location Mean:	*6.05*	*4.07*	*5.62*	*2.10*	*5.80*	5.31	*100*	*2.10*	*100*

Yield Summary for the 1996 Intrastate Alfalfa Yield Trial

	Bozeman			Kalispell - Irrigated			Kalispell - Dryland			Sidney - Irrigated			Moccasin - Dryland	
	1997 t/a	1998 t/a	1999 t/a	1997 t/a	1998 t/a	1999 t/a	1997 t/a	1998 t/a	1999 t/a	1997 t/a	1998 t/a	1999 t/a	1997 t/a	1998 t/a
Variety														
MT9321	5.71	6.60	6.05	2.37	5.61	4.30	5.22	6.26	5.21	5.01	7.26	5.6	2.85	1.49
Cooper	5.58	6.76	6.05	2.55	5.34	4.28	5.54	6.55	5.39	5.28	6.83	5.30	2.81	1.41
Shaw	5.80	6.46	5.86	2.91	5.14	4.09	5.35	5.85	4.62	5.05	7.00	5.60	2.98	1.51
Riley	5.09	6.19	5.53	2.61	4.41	3.90	5.48	5.85	4.96	4.71	6.84	5.11	2.50	1.32
Onieda VR	5.76	6.50	5.80	2.38	6.02	4.80	5.33	6.00	5.46	4.56	6.48	5.07	2.74	1.51
Wrangler	5.74	6.57	5.95	2.65	5.94	4.86	5.12	5.55	6.01	4.99	6.89	5.24	2.50	1.48
Ladak 65	5.19	6.04	5.61	2.02	5.12	3.77	4.67	5.23	5.66	5.25	6.77	4.72	2.68	1.45
LSD (0.05)	0.38	0.34	0.37	0.50	0.54	0.51	0.96	0.55	0.66	0.66	0.60	0.50	0.31	0.12
CV	4.78	3.65	4.52	35.17	7.33	8.30	13.03	10.80	8.60	9.35	6.11	6.59	7.94	5.92

Statewide average yield of alfalfa varieties planted in 1996, and harvested in in 1997, 1998, 1999

Cultivar	Bozeman irrigated	Kalispell irrigated	Kalispell dryland	Moccasin dryland	Sidney irrigated	Average
MT9321	6.12.	4.09	5.56	2.17	5.96	4.78
Cooper	6.13	4.06	5.83	2.11	5.80	4.79
Shaw	6.04	4.05	5.27	2.25	5.88	4.70
Riley	5.60	3.64	5.43	1.91	5.55	4.43
Oneida VR	6.02	4.40	5.60	2.12	5.38	4.70
Wrangler	6.09	4.48	5.56	1.99	5.71	4.77
Ladak 65	5.61	3.64	5.19	2.06	5.58	4.42

Fall Dormancy Test 04-1. Planted in greenhouse 4/13/04; transplanted to the field at Northfield, MN 6/14/04; last cut 9/8/04; evaluated 10/17/04 by S. Sargent.

Entry	Mean plant height (cm.)	No. plants in test
Maverick (FD=1)	15.5	85
Vernal (FD=2)	18.9	84
5246 (FD=3)	24.8	93
Legend (FD=4)	30.5	120
Archer (FD=5)	32.2	125
ABI700 (FD=6)	35.5	113
Dona Ana (FD=7)	36.5	110
Pierce (FD=8)	42.0	95
MT9321	25.3	118
Test mean	29.37	-
C.V. (%)	6.6	-
LSD (.05)	2.77	-
Number of entries = 16		
Number of replications = 4		

ANOVA: Mean plant height (cm.)

Source	df	Type III SS	MS	F	P
Blocks	3	51.835	17.278333	4.5646814	.0071 **
Main Effects					
Entry	15	2974.0675	198.27117	52.380324	.0000 ***
Error	45	170.335	3.7852222<-		
Total	63	3196.2375			

Flower color notes in Fall Dormancy test 04-1, at Northfield, MN. Notes taken 9/1/04.

		Percent of plants in color category				
Entry	No. plants	Purple	Variegated	Yellow	White	Cream
MT0321	102	84%	16%	0	0	0

Phytophthora Root Rot Test 04-2. Planted 2/6/04; inoculated 2/27/04; evaluated 4/10/04 by S. Sargent.

Entry	% Resistance (=% 1's & 2's)	% Resistance adjusted to Agate = 43%	ASI (1-6, 6=dead)
Saranac	6.9	7.6	4.7
Agate	38.8	43.0	3.7
MT9321	54.4	60.3	3.2
Test mean	32.88	36.44	3.88
C.V. (%)	16.1	16.0	10.1
LSD (.05)	8.15	9.03	0.60

Number of entries = 5
Number of replications = 4

ANOVA: % Resistance (= % Plants rated 1 or 2)

Source	df	Type III SS	MS	F	P
Blocks	3	78.4375	26.145833	0.9348231	.4540 ns
Main Effects					
Entry	4	4701.875	1175.4688	42.027933	.0000 ***
Error	12	335.625	27.96875<-		
Total	19	5115.9375			

ANOVA: ASI

Source	df	Type III SS	MS	F	P
Blocks	3	78.4375	26.145833	0.9348231	.4540 ns
Main Effects					
Entry	4	4701.875	1175.4688	42.027933	.0000 ***
Error	12	335.625	27.96875<-		
Total	19	5115.9375			

Verticillium Wilt Resistance Test 04-1. Planted 1/31/04; inoculated 3/13/04; evaluated 4/20/04 by S. Sargent.

Entry	% Resistance (=% 1's & 2's)	% Resistance adjusted to Vertus = 40%	ASI (1-5, 5=dead)
Saranac	4.2	5.0	4.1
Vertus	33.2	40.0	3.8
MT9321	41.0	49.4	3.2
Test mean	41.32	49.78	3.26
C.V. (%)	13.0	13.0	10.1
LSD (.05)	7.78	9.37	0.48

Number of entries = 10
Number of replications = 4

ANOVA: % Resistance (= % Plants rated 1 or 2)

Source	df	Type III SS	MS	F	P
Blocks	3	112.03475	37.344917	1.3015731	.2942 ns
Main Effects					
Entry	9	9886.99525	1098.555	38.287666	.0000 ***
Error	27	774.68775	28.692139<-		
Total	39	10773.71775			

ANOVA: ASI

Source	df	Type III SS	MS	F	P
Blocks	3	0.25475	0.0849167	0.7857938	.5123 ns
Main Effects					
Entry	9	7.64125	0.8490278	7.8566532	.0000 ***
Error	27	2.91775	0.1080648<-		
Total	39	10.81375			

Fusarium Wilt Resistance Test 04-1. Greenhouse test. Planted 5/704; inoculated and transplanted 7/29/04; evaluated 10/28/04 by S. Sargent.

Entry	% Resistance (=% 0's & 1's)	% Resistance adjusted to Agate (mean) = 45%
MNGN-1	3.2	3.3
Agate	43.2	45.0
MT9321	44.0	45.9
Test mean	53.26	55.48
C.V. (%)	14.1	14.1
LSD (.05)	10.75	11.20

Number of entries = 14
Number of replications = 4
Number of plants tested per entry = 84-160

ANOVA: % Resistance (= % Plants rated 1 or 2)

Source	df	Type III SS	MS	F	P
Blocks	3	52.05339286	17.351131	0.3071988	.8200 ns
Main Effects					
Entry	13	17809.04875	1369.9268	24.254317	.0000 ***
Error	39	2202.789107	56.481772<-		
Total	55	20063.89125			

Bacterial Wilt Resistance Test 04-1. Greenhouse test. Planted 5/6/04; inoculated and transplanted 7/27/04; evaluated 10/30/04 by S. Sargent.

Entry	% Resistance (=% 0's & 1's)	% Resistance adjusted to Vernal = 40%
Vernal	39.1	40.0
Narragansett	4.5	4.7
Sonora	4.5	4.7
MT9321	35.9	36.7
Test mean	33.12	33.88
C.V. (%)	17.8	17.8
LSD (.05)	8.56	8.76

Number of entries = 10
Number of replications = 4
Number of plants tested per entry = 128-174

ANOVA: % Resistance (= % Plants rated 1 or 2)

Source	df	Type III SS	MS	F	P
Blocks	3	154.25075	51.416917	1.4776049	.2428 ns
Main Effects					
Entry	9	8420.56725	935.61858	26.887545	.0000 ***
Error	27	939.53175	34.797472<-		
Total	39	9514.34975			

CROP CHARACTERISTICS, INC.
21130 EATON AVENUE, FARMINGTON, MN 55024
PHONE (612) 460-2400 FAX (612) 460-2401

Aphanomyces Root Rot Test 04-1. Planted 1/26/04; inoculated 2/2/04; evaluated 2/16/04 by S. Sargent.

Entry	% Resistance (=% 1's & 2's)	% Resistance adjusted to WAPH-1 = 50%	ASI (1-5, 5=dead)
Saranac	1.8	1.7	4.5
WAPH-1	55.2	50.0	2.8
MT9321	35.4	32.0	3.1
Test mean	25.37	22.98	3.54
C.V. (%)	12.2	12.2	6.8
LSD (.05)	4.96	4.49	0.39

Number of entries = 4
Number of replications = 4

ANOVA: % Resistance (= % Plants rated 1 or 2)

Source	df	Type III SS	MS	F	P
Blocks	3	124.491875	41.497292	4.3233539	.0380 *
Main Effects					
Entry	3	7234.036875	2411.3456	251.22363	.0000 ***
Error	9	86.385625	9.5984028<-		
Total	15	7444.914375			

ANOVA: ASI

Source	df	Type III SS	MS	F	P
Blocks	3	0.5025	0.1675	2.8851675	.0950 ns
Main Effects					
Entry	3	6.9525	2.3175	39.91866	.0000 ***
Error	9	0.5225	0.0580556<-		
Total	15	7.9775			

Pea Aphid Resistance Test 04-2, on dormant and semi-dormant alfalfas.
Planted 2/7/04; infested 2/13/04; evaluated 3/6/04 by S. Sargent.

Entry	% Resistance (=% 1's, 2's & 3's)	% Resistance adjusted to Baker = 45%	ASI (1-5, 5=dead)
Vernal	5.0	4.8	4.8
Baker	46.5	45.0	3.5
MT9321	42.3	41.0	3.7
Test mean	47.02	45.50	3.50
C.V. (%)	18.7	18.7	8.5
LSD (.05)	12.60	12.19	0.43

Number of entries = 13
Number of replications = 4

ANOVA: % Resistance (= % Plants rated 1, 2 or 3)

Source	df	Type III SS	MS	F	P
Blocks	3	561.64	187.21333	2.4242799	.0816 ns
Main Effects					
Entry	12	17001.65731	1416.8048	18.346617	.0000 ***
Error	36	2780.075	77.224306<-		
Total	51	20343.37231			

ANOVA: ASI

Source	df	Type III SS	MS	F	P
Blocks	3	0.886730769	0.2955769	3.3453446	.0297 *
Main Effects					
Entry	12	16.18230769	1.3485256	15.262636	.0000 ***
Error	36	3.180769231	0.0883547<-		
Total	51	20.24980769			

Spotted Alfalfa Aphid Resistance Test 04-2. Planted 2/25/04; infested 3/3/04; evaluated 3/31/04 by S. Sargent.

Entry	% Resistance (=% 1's & 2's)	% Resistance adjusted to Baker = 50%	ASI (1-5, 5=dead)
Arc	0.6	0.6	4.8
Baker	47.2	50.0	3.0
MT9321	16.9	17.9	4.1
Test mean	21.53	22.81	3.96
C.V. (%)	15.4	15.4	3.5
LSD (.05)	5.73	6.07	0.24

Number of entries = 3
Number of replications = 4

ANOVA: % Resistance (= % Plants rated 1 or 2)

Source	df	Type III SS	MS	F	P
Blocks	3	17.31333333	5.7711111	0.5269886	.6798 ns
Main Effects					
Entry	2	4484.046667	2242.0233	204.73022	.0000 ***
Error	6	65.70666667	10.951111<-		
Total	11	4567.066667			

ANOVA: ASI

Source	df	Type III SS	MS	F	P
Blocks	3	0.089166667	0.0297222	1.5735294	.2909 ns
Main Effects					
Entry	2	6.926666667	3.4633333	183.35294	.0000 ***
Error	6	0.113333333	0.0188889<-		
Total	11	7.129166667			

CROP CHARACTERISTICS, INC.
21130 EATON AVENUE, FARMINGTON, MN 55024
PHONE (651) 460-2400 FAX (651) 460-2401

Northern Root-knot Nematode (M. hapla) test 04-2. Planted 2/19/04; inoculated 3/27/04; evaluated 6/25/04 by S. Sargent.

Entry	% Resistance (% = 1's)	%Resistance - adjusted to Nev. Syn XX = 90%	ASI (1-4, 1=no galls)
Lahontan	2.7	3.3	2.9
Nev. SynXX	75.0	90.0	1.4
MT9321	45.9	55.1	1.9
Test mean	41.2	49.44	2.09
C.V. (%)	10.2	10.2	6.4
LSD (.05)	7.26	8.71	0.23

Number of entries = 3
Number of replications = 4

ANOVA: % Resistance (= % Plants rated 1)

Source	df	Type III SS	MS	F	P
Blocks	3	35.94	11.98	0.6812302	.5950 ns
Main Effects					
Entry	2	10592.945	5296.4725	301.17836	.0000 ***
Error	6	105.515	17.585833<-		
Total	11	10734.4			

ANOVA: ASI

Source	df	Type III SS	MS	F	P
Blocks	3	0.009166667	0.0030556	0.1692308	.9133 ns
Main Effects					
Entry	2	4.571666667	2.2858333	126.6	.0000 ***
Error	6	0.108333333	0.0180556<-		
Total	11	4.689166667			

CROP CHARACTERISTICS, INC.
21130 EATON AVENUE, FARMINGTON, MN 55024
PHONE (651) 460-2400 FAX (651) 460-2401

Alfalfa Stem Nematode Resistance Test 04-1. Planted 2/18/04; inoculated 3/6/04 and 3/27/04; evaluated 6/21/04 by S. Sargent.

Entry	% Resistance (=% 1's & 2's)	% Resistance adjusted to Vernema = 60%	ASI (1-5, 5=dead)
Ranger	7.1	8.0	3.8
Lahontan	37.7	42.2	3.1
Vernema	53.6	60.0	2.8
MT9321	34.9	39.1	3.2
Test mean	30.07	33.60	3.10
C.V. (%)	15.1	15.1	7.4
LSD (.05)	6.53	7.30	0.33

Number of entries = 13
Number of replications = 4

ANOVA: % Resistance (= % Plants rated 1 or 2)

Source	df	Type III SS	MS	F	P
Blocks	3	210.6792308	70.22641	3.3857842	.0284 *
Main Effects					
Entry	12	7132.187308	594.34894	28.654993	.0000 ***
Error	36	746.6957692	20.741549<-		
Total	51	8089.562308			

ANOVA: ASI

Source	df	Type III SS	MS	F	P
Blocks	3	0.117692308	0.0392308	0.7404719	.5349 ns
Main Effects					
Entry	12	4.374230769	0.3645192	6.8802178	.0000 ***
Error	36	1.907307692	0.0529808<-		
Total	51	6.399230769			

Table 1.

1999 SUMMARY OF THE MONTANA 1996 UNIFORM INTRASTATE ALFALFA YIELD TRIAL AT BOZEMAN - IRRIGATED
(YIELD IN TONS/ACRE DRY MATTER)

ID	PEDIGREE	1997 TOTAL	1998 TOTAL	6/20/99	8/3/99	9/1/99	1999 TOTAL	3 YR AV	% MEAN
MT 316	BIGHORN	6.10	6.99	3.41	2.50	0.26	6.17	6.42	106.12
MT 322	HYLAND	6.00	6.86	3.46	2.47	0.29	6.22	6.36	105.12
MT 318	WL 324	6.19	6.83	3.12	2.55	0.29	5.95	6.32	104.46
MT 263	5454	5.95	6.77	3.32	2.59	0.30	6.21	6.31	104.30
MT 314	XAL 46	5.71	6.71	3.35	2.69	0.31	6.35	6.26	103.47
MT 229	ULTRA	6.04	6.75	3.30	2.46	0.23	5.99	6.26	103.47
MT 324	OASIS 371	5.95	6.86	3.24	2.36	0.28	5.89	6.23	102.98
MT 248	4J19	6.04	6.65	3.23	2.47	0.27	5.97	6.22	102.81
MT 238	MAGNUM III	5.87	6.76	3.23	2.52	0.24	5.99	6.21	102.64
MT 323	MAGNAGRAZE	5.94	6.83	3.13	2.34	0.28	5.74	6.17	101.98
MT 319	WL 325 HQ	5.99	6.60	3.01	2.60	0.27	5.88	6.16	101.82
MT 335	MT 9503	5.58	6.76	3.42	2.39	0.24	6.05	6.13	101.32
MT 333	MT 9321	5.71	6.60	3.49	2.33	0.23	6.05	6.12	101.16
MT 317	329	5.63	6.46	3.22	2.63	0.33	6.18	6.09	100.66
MT 146	WRANGLER	5.74	6.57	3.30	2.42	0.23	5.95	6.09	100.66
MT 328	MT 9305	5.80	6.46	3.28	2.31	0.26	5.86	6.04	99.83
MT 309	ONEIDA VR	5.76	6.50	3.17	2.38	0.26	5.80	6.02	99.50
MT 321	LEGENDAIRY 2.0	5.80	6.39	3.23	2.32	0.28	5.83	6.01	99.34
MT 330	MT 9308	5.71	6.47	3.21	2.34	0.24	5.79	5.99	99.01
MT 315	AFFINITY+Z	5.67	6.57	3.10	2.31	0.25	5.66	5.97	98.68
MT 320	RANIER	5.56	6.44	3.23	2.33	0.29	5.84	5.95	98.35
MT 329	MT 9306	5.54	6.58	3.20	2.33	0.21	5.74	5.95	98.35
MT 334	MT 9316	5.73	6.52	3.13	2.24	0.22	5.59	5.95	98.35
MT 331	MT 9309	5.56	6.37	3.35	2.34	0.20	5.89	5.94	98.18
MT 332	MT 9310	5.52	6.38	3.22	2.34	0.23	5.79	5.90	97.52
MT 325	MT 9302	5.25	6.47	3.29	2.40	0.23	5.91	5.88	97.19
MT 327	MT 9304	5.55	6.38	2.98	2.19	0.24	5.41	5.78	95.54
MT 2	LADAK 65	5.19	6.04	3.41	2.05	0.16	5.61	5.61	92.73
MT 122	RILEY	5.09	6.19	3.29	2.01	0.23	5.53	5.60	92.56
MT 326	MT 9303	5.08	6.12	3.05	2.31	0.18	5.54	5.58	92.23
SITEMEAN		5.70	6.56	3.25	2.39	0.25	5.88	6.05	
LSD (0.05)		0.38	0.34	0.29	0.22	0.06	0.37		
CV (S/MEAN)*100		4.78	3.65	6.36	6.47	16.39	4.52		

Seeding date: 5/9/96

Fertilizer: P_2O_5 - pre-plant

Table 6.

1999 SUMMARY OF THE MONTANA 1996 UNIFORM INTRASTATE ALFALFA YIELD TRIAL AT KALISPELL - DRYLAND
(YIELD IN TONS/ACRE DRY MATTER)

MT NO.	PEDIGREE	1997 TOTAL	1998 TOTAL	6/15/99	7/27/99	9/1/99	1999 TOTAL	3 YR AVG	% MEAN
MT 318	WL 324	6.17	6.12	2.87	1.76	1.36	5.99	6.17	109.59
MT 229	ULTRA	5.69	6.09	2.32	1.48	1.12	4.92	5.69	101.07
MT 327	MT 9304	5.68	6.36	2.06	1.39	1.07	4.51	5.68	100.89
MT 316	BIGHORN	5.66	6.70	2.30	1.57	1.25	5.12	5.66	100.53
MT 320	RAINIER	5.58	6.83	2.79	1.67	1.32	5.78	5.58	99.11
MT 335	MT 9503	5.54	6.55	2.58	1.59	1.21	5.39	5.54	98.40
MT 122	RILEY	5.48	5.85	2.40	1.43	1.12	4.96	5.48	97.34
MT 314	XAL 46	5.47	7.45	3.03	2.02	1.57	6.62	5.47	97.16
MT 322	HYLAND	5.41	6.32	2.90	1.88	1.46	6.23	5.41	96.09
MT 263	5454	5.38	6.92	2.85	1.83	1.48	6.17	5.38	95.56
MT 328	MT 9305	5.35	5.85	2.15	1.39	1.07	4.62	5.35	95.03
MT 309	ONEIDA VR	5.33	6.00	2.62	1.62	1.22	5.46	5.33	94.67
MT 331	MT 9309	5.32	5.56	2.48	1.50	1.06	5.05	5.32	94.49
MT 315	AFFINITY+Z	5.28	6.14	2.58	1.59	1.19	5.36	5.28	93.78
MT 319	WL 325 HQ	5.28	6.51	2.54	1.68	1.30	5.52	5.28	93.78
MT 323	MAGNAGRAZE	5.25	6.89	2.90	1.90	1.46	6.27	5.25	93.25
MT 333	MT 9321	5.22	6.26	2.59	1.50	1.13	5.21	5.22	92.72
MT 248	4J19	5.21	6.46	2.46	1.61	1.26	5.33	5.21	92.54
MT 332	MT 9310	5.20	5.83	2.71	1.67	1.19	5.58	5.20	92.36
MT 330	MT 9308	5.17	5.75	2.58	1.51	1.15	5.25	5.17	91.83
MT 325	MT 9302	5.16	5.60	2.35	1.46	1.12	4.92	5.16	91.65
MT 238	MAGNUM III	5.14	6.55	2.72	1.75	1.37	5.84	5.14	91.30
MT 146	WRANGLER	5.12	5.55	2.93	1.78	1.30	6.01	5.12	90.94
MT 324	OASIS 371	4.99	6.48	2.75	1.67	1.25	5.66	4.99	88.63
MT 329	MT 9306	4.96	5.75	2.51	1.53	1.15	5.19	4.96	88.10
MT 321	LEGENDAIRY 2.0	4.76	6.07	2.36	1.55	1.17	5.08	4.76	84.55
MT 334	MT 9316	4.71	6.05	2.96	1.69	1.19	5.84	4.71	83.66
MT 2	LADAK 65	4.67	5.23	2.84	1.70	1.13	5.66	4.67	82.95
MT 317	329	4.46	6.12	2.30	1.69	1.23	5.21	4.46	79.22
MT 326	MT 9303	4.39	5.15	2.36	1.33	0.98	4.68	4.39	77.98
SITEMEAN		5.25	6.19	2.59	1.62	1.23	5.46	5.63	
LSD (0.05)		0.96	0.55	0.34	0.21	0.15	0.66		
CV (SMEAN)*100		13.03	10.80	9.30	9.20	8.80	8.60		

Seeding date: 4/26/96

Seeding rate: 8 lbs PLS/acre

Fertilizer: 13 lbs/a N + 62 lbs/a P_2O_5 - 4/2/99

Table 7.

1999 SUMMARY OF THE MONTANA 1996 UNIFORM INTRASTATE ALFALFA YIELD TRIAL AT KALISPELL - IRRIGATED
(YIELD IN TONS/ACRE DRY MATTER)

ID	PEDIGREE	1997 TOTAL	1998 TOTAL	06/24/99	07/29/99	09/03/99	99 TOTAL	3 YR AVG	% MEAN
MT 322	HYLAND	2.86	5.82	2.71	1.30	1.07	5.08	4.59	112.50
MT 146	WRANGLER	2.65	5.94	2.79	1.15	0.91	4.86	4.48	109.80
MT 229	ULTRA	3.08	5.82	2.54	1.02	0.92	4.47	4.46	109.31
MT 320	RAINIER	2.88	5.57	2.61	1.15	1.01	4.78	4.41	108.09
MT 309	ONEIDA VR	2.38	6.02	2.61	1.22	0.97	4.80	4.40	107.84
MT 319	WL 325 HQ	2.56	5.73	2.55	1.26	1.03	4.85	4.38	107.35
MT 324	OASIS 371	2.79	5.59	2.69	1.15	0.90	4.73	4.37	107.11
MT 238	MAGNUM III	2.79	5.46	2.57	1.15	0.98	4.70	4.32	105.88
MT 317	329	2.71	5.57	2.42	1.16	1.00	4.58	4.29	105.15
MT 323	MAGNAGRAZE	2.64	5.29	2.62	1.24	1.00	4.86	4.26	104.41
MT 263	5454	2.57	5.24	2.66	1.20	0.98	4.84	4.22	103.43
MT 318	WL 324	2.51	5.38	2.50	1.14	0.95	4.58	4.16	101.96
MT 314	XAL 46	2.33	5.34	2.56	1.24	1.02	4.82	4.16	101.96
MT 321	LEGENDAIRY 2.0	2.80	5.28	2.34	1.08	0.95	4.37	4.15	101.72
MT 316	BIGHORN	2.66	5.28	2.41	1.08	1.02	4.51	4.15	101.72
MT 333	MT 9321	2.37	5.61	2.48	0.99	0.83	4.30	4.09	100.25
MT 248	4J19	2.50	5.33	2.35	1.08	0.99	4.42	4.08	100.00
MT 335	MT 9503	2.55	5.34	2.41	1.04	0.83	4.28	4.06	99.51
MT 328	MT 9305	2.91	5.14	2.35	0.93	0.81	4.09	4.05	99.26
MT 332	MT 9310	2.47	5.22	2.48	0.96	0.78	4.21	3.97	97.30
MT 327	MT 9304	2.32	5.12	2.25	1.00	0.83	4.08	3.84	94.12
MT 315	AFFINITY+Z	2.37	4.92	2.41	1.00	0.82	4.23	3.84	94.12
MT 330	MT 9308	2.85	4.71	2.29	0.90	0.73	3.92	3.83	93.87
MT 326	MT 9303	2.33	5.01	2.45	0.94	0.72	4.12	3.82	93.63
MT 334	MT 9316	2.33	4.92	2.22	0.93	0.74	3.89	3.71	90.93
MT 329	MT 9306	2.23	4.82	2.31	0.97	0.74	4.02	3.69	90.44
MT 2	LADAK 65	2.02	5.12	2.40	0.76	0.61	3.77	3.64	89.22
MT 122	RILEY	2.61	4.41	2.31	0.86	0.73	3.90	3.64	89.22
MT 331	MT 9309	2.24	4.78	2.13	0.84	0.66	3.63	3.55	87.01
MT 325	MT 9302	2.19	4.88	1.97	0.83	0.71	3.51	3.53	86.52
SITEMEAN		2.56	5.30	2.45	1.05	0.88	4.39	4.08	
LSD (0.05)		0.50	0.54	0.28	0.12	0.15	0.51		
CV(S/MEAN)*100		35.17	7.33	8.20	8.20	12.00	8.30		

Seeding date: 5/10/96

Seeding rate: 8 lbs/a

Failure to establish due to standing water in nursery - reseeded 6/5/96

Fertilizer: 13 lbs/a N + 62 lbs/a P_2O_5 - 4/2/99

Table 12.

1999 SUMMARY OF THE MONTANA 1996 UNIFORM INTRASTATE ALFALFA YIELD TRIAL AT SIDNEY - IRRIGATED
(YIELD IN TONS/ACRE DRY MATTER)

ID	PEDIGREE	1997 TOTAL	1998 TOTAL	6/11/99	7/13/99	8/19/99	1999 TOTAL	3 YR AV	% MEAN
MT 323	MAGNAGRAZE	5.44	7.22	2.77	1.49	1.57	5.83	6.16	106.21
MT 324	OASIS 371	5.50	7.17	2.72	1.47	1.53	5.71	6.13	105.69
MT 314	XAL 46	5.21	7.21	2.66	1.51	1.57	5.74	6.05	104.31
MT 320	RAINIER	5.18	7.27	2.65	1.46	1.48	5.59	6.01	103.62
MT 333	MT 9321	5.01	7.26	2.83	1.23	1.54	5.60	5.96	102.76
MT 229	ULTRA	5.23	7.00	2.70	1.36	1.48	5.54	5.92	102.07
MT 315	AFFINITY+Z	5.31	6.90	2.65	1.41	1.48	5.53	5.91	101.90
MT 316	BIGHORN	5.26	7.11	2.58	1.38	1.42	5.37	5.91	101.90
MT 322	HYLAND	5.19	7.07	2.68	1.34	1.41	5.43	5.90	101.72
MT 331	MT 9309	5.11	7.12	2.72	1.32	1.40	5.44	5.89	101.55
MT 328	MT 9305	5.05	7.00	2.86	1.32	1.42	5.60	5.88	101.38
MT 248	4J19	5.19	6.89	2.67	1.37	1.43	5.46	5.85	100.86
MT 327	MT 9304	5.14	7.03	2.63	1.34	1.39	5.37	5.85	100.86
MT 317	329	5.11	7.09	2.65	1.30	1.32	5.27	5.82	100.34
MT 335	MT 9503	5.28	6.83	2.72	1.21	1.38	5.30	5.80	100.00
MT 334	MT 9316	5.22	7.00	2.55	1.25	1.34	5.15	5.79	99.83
MT 263	5454	4.93	6.88	2.63	1.41	1.50	5.54	5.78	99.66
MT 329	MT 9306	4.88	6.96	2.73	1.33	1.42	5.49	5.78	99.66
MT 332	MT 9310	5.12	6.84	2.78	1.16	1.41	5.34	5.77	99.48
MT 321	LEGENDAIRY 2.'	5.01	6.97	2.54	1.39	1.36	5.29	5.76	99.31
MT 319	WL 325 HQ	4.58	7.07	2.60	1.53	1.48	5.61	5.75	99.14
MT 318	WL 324	4.81	6.91	2.63	1.35	1.42	5.41	5.71	98.45
MT 146	WRANGLER	4.99	6.89	2.83	1.20	1.21	5.24	5.71	98.45
MT 238	MAGNUM III	4.97	6.63	2.65	1.38	1.47	5.50	5.70	98.28
MT 325	MT 9302	4.75	7.06	2.61	1.19	1.34	5.14	5.65	97.41
MT 330	MT 9308	4.64	6.78	2.71	1.20	1.47	5.38	5.60	96.55
MT 2	LADAK 65	5.25	6.77	2.65	0.97	1.11	4.72	5.58	96.21
MT 122	RILEY	4.71	6.84	2.52	1.23	1.36	5.11	5.55	95.69
MT 326	MT 9303	4.79	6.69	2.63	1.19	1.23	5.05	5.51	95.00
MT 309	ONEIDA VR	4.59	6.48	2.47	1.25	1.35	5.07	5.38	92.76
SITEMEAN		5.05	6.97	2.67	1.32	1.41	5.40	5.80	
LSD (0.05)		0.66	0.60	0.25	0.18	0.19	0.50		
CV (S/MEAN)*100		9.35	6.11	6.55	9.71	9.64	6.59		

Table 16.

1999 SUMMARY OF THE MONTANA 1996 UNIFORM INTRASTATE ALFALFA YIELD TRIAL AT MOCCASIN - DRYLAND
(YIELD IN TONS/ACRE DRY MATTER)

ID	PEDIGREE	1997 TOTAL	1998 TOTAL	1999 TOTAL	2 YR AV	% MEAN
MT 318	WL 324	3.18	1.46	NA	2.32	110.48
MT 328	MT 9305	2.98	1.51	NA	2.25	107.14
MT 327	MT 9304	2.88	1.50	NA	2.19	104.29
MT 333	MT 9321	2.85	1.49	NA	2.17	103.33
MT 326	MT 9303	2.91	1.40	NA	2.16	102.86
MT 238	MAGNUM III	2.85	1.46	NA	2.16	102.86
MT 321	LEGENDAIRY 2.0	2.83	1.48	NA	2.16	102.86
MT 324	OASIS 371	2.86	1.41	NA	2.13	101.43
MT 329	MT 9306	2.81	1.45	NA	2.13	101.43
MT 229	ULTRA	2.81	1.44	NA	2.12	100.95
MT 309	ONEIDA VR	2.74	1.51	NA	2.12	100.95
MT 316	BIGHORN	2.86	1.39	NA	2.12	100.95
MT 315	AFFINITY+Z	2.86	1.38	NA	2.12	100.95
MT 248	EXCALIBUR II	2.77	1.47	NA	2.12	100.95
MT 322	HYLAND	2.78	1.44	NA	2.11	100.48
MT 335	MT 9503	2.81	1.41	NA	2.11	100.48
MT 331	MT 9309	2.85	1.36	NA	2.10	100.00
MT 325	MT 9302	2.78	1.41	NA	2.09	99.52
MT 334	MT 9316	2.74	1.43	NA	2.08	99.05
MT 319	WL 325 HQ	2.65	1.49	NA	2.07	98.57
MT 2	LADAK 65	2.68	1.45	NA	2.06	98.10
MT 332	MT 9310	2.79	1.34	NA	2.06	98.10
MT 317	329	2.71	1.40	NA	2.05	97.62
MT 330	MT 9308	2.63	1.44	NA	2.04	97.14
MT 320	RAINIER	2.68	1.38	NA	2.03	96.67
MT 263	5454	2.64	1.35	NA	2.00	95.24
MT 323	MAGNAGRAZE	2.57	1.41	NA	1.99	94.76
MT 146	WRANGLER	2.50	1.48	NA	1.99	94.76
MT 314	XAL 46	2.63	1.33	NA	1.98	94.29
MT 122	RILEY	2.50	1.32	NA	1.91	90.95
SITEMEAN		**2.75**	**1.43**	**NA**	**2.1**	
LSD (0.05)		**0.31**	**0.12**	**NA**	**0.17**	
CV (S/MEAN)*100		**7.94**	**5.92**	**NA**	**5.74**	

Fertilizer: 50 lbs/a 18-46-0 at planting; 100 lbs/a 21-0-0-24, May 1997
Data not available for 1999 harvest