

PROGRESS REPORT ON GRASS SEED PRODUCTION RESEARCH
prepared by

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Grass-Legume Seed Institute
Roseau, Minnesota
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**Table 1. Monthly and year end total precipitation*
Roseau ,Mn 1967-2008.**

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Yearly Total(in.)	DEVIATION FROM MEAN	Park' blg. mean yield lbs/A
1967	1.13	0.39	0.59	2.89	0.89	2.23	4.95	1.69	0.83	1.11	0.70	1.76	19.16	-2.96	
1968	0.62	T	1.25	0.63	1.46	6.47	6.13	8.49	2.35	1.26	1.06	0.21	29.93	7.81	650
1969	3.07	0.11	0.05	1.27	3.31	2.29	3.70	4.28	3.29	1.91	0.30	0.73	24.31	2.19	488
1970	0.71	0.41	1.38	2.56	5.93	4.07	3.55	0.83	2.77	1.49	1.21	0.37	25.28	3.16	673
1971	0.54	0.13	0.26	1.50	2.24	2.29	3.58	0.69	3.33	2.97	0.29	0.50	18.32	-3.80	492
1972	0.68	0.76	0.50	0.70	1.66	5.03	1.92	1.53	4.22	1.40	0.38	0.32	19.10	-3.02	405
1973	0.09	0.17	1.18	0.90	2.46	2.21	4.04	2.09	5.67	1.19	0.67	0.75	21.42	-0.70	422
1974	0.88	0.87	0.16	2.72	4.12	1.56	2.56	11.00	0.42	0.66	0.15	1.40	26.47	4.35	642
1975	1.10	0.29	0.64	1.40	1.52	4.96	2.26	1.75	1.79	1.49	0.20	0.65	18.05	-4.07	504
1976	1.13	0.50	1.05	0.77	0.54	5.82	1.52	3.72	0.34	0.07	T	0.37	15.83	-6.29	146
1977	0.14	0.62	1.02	0.27	2.43	3.71	2.28	1.74	3.83	0.87	2.27	0.26	19.44	-2.68	140
1978	0.36	0.26	0.17	1.00	1.97	1.92	6.25	3.25	3.44	0.23	0.98	0.79	20.62	-1.50	507
1979	0.50	1.01	1.06	2.77	1.89	1.91	3.70	1.59	0.45	1.40	1.02	0.16	17.46	-4.66	415
1980	0.55	0.82	0.35	0.00	0.24	1.75	3.35	5.19	4.12	1.66	0.94	0.18	19.15	-2.97	62
1981	0.27	0.16	0.66	0.56	2.79	6.85	2.63	2.41	3.63	1.75	0.90	0.99	23.60	1.48	625
1982	1.30	0.45	0.74	0.24	1.38	2.00	5.53	2.71	1.92	2.91	0.46	0.57	20.21	-1.91	595
1983	1.31	1.26	1.17	0.53	2.76	4.03	1.62	3.34	2.91	2.26	0.66	0.10	21.95	-0.17	605
1984	T	0.95	T	0.72	0.72	4.46	3.78	0.99	0.37	4.32	0.10	1.02	17.43	-4.69	613
1985	0.12	0.33	0.06	1.07	4.35	4.62	1.08	8.72	1.60	1.04	1.68	0.38	25.05	2.93	525
1986	0.30	0.90	0.26	2.96	1.40	2.43	3.59	2.04	2.52	0.65	1.97	0.36	19.38	-2.74	488
1987	0.47	0.30	0.10	0.59	4.37	2.25	4.80	2.22	0.82	0.92	0.73	0.35	17.92	-4.20	288
1988	0.60	0.09	1.75	0.00	1.74	1.34	5.53	1.70	2.24	0.12	0.77	1.05	16.93	-5.19	152
1989	3.27	0.32	2.86	0.10	2.82	5.46	1.60	2.56	1.24	0.41	0.62	0.45	21.71	-0.41	320
1990	0.55	0.20	1.12	1.09	0.46	3.19	2.48	0.62	0.91	0.16	0.18	0.72	11.68	-10.44	160
1991	0.56	0.64	0.58	2.87	3.19	5.94	3.40	1.99	7.42	1.64	1.36	0.70	30.29	8.17	210
1992	0.61	0.68	0.45	2.27	1.99	2.36	2.72	4.51	2.76	0.12	1.27	0.88	20.62	-1.50	630
1993	0.68	0.05	0.27	1.01	1.63	5.06	5.87	4.69	0.72	0.71	0.45	0.65	21.79	-0.33	490
1994	0.21	0.33	0.47	0.02	0.16	2.54	3.03	3.48	3.94	1.38	2.72	0.32	18.60	-3.52	230
1995	0.57	0.59	1.23	0.61	2.50	2.13	4.59	3.59	1.81	1.33	1.54	1.46	21.95	-0.17	300
1996	0.94	0.48	0.22	1.65	4.62	1.64	7.34	1.78	1.77	1.75	2.73	1.07	25.99	3.87	250
1997	1.06	0.14	1.02	0.84	2.02	3.36	4.02	1.31	4.01	2.45	0.19	0.25	20.67	-1.45	350
1998	0.69	1.05	0.21	0.77	4.55	5.39	3.01	2.20	0.31	4.42	1.39	0.95	24.94	2.82	275
1999	0.15	0.77	0.23	1.31	4.09	6.97	3.46	1.38	3.16	0.43	0.38	0.56	22.89	0.77	400
2000	0.45	0.14	0.79	0.38	1.83	7.38	1.63	6.45	2.14	2.89	3.41	0.74	28.23	6.11	550
2001	0.21	0.52	0.46	1.89	3.27	1.76	4.74	1.40	0.72	1.76	1.50	0.56	18.79	-3.33	575
2002	0.19	0.10	0.45	1.44	2.79	9.94	2.96	4.47	1.62	1.02	0.30	0.54	25.82	3.70	300
2003	0.80	0.77	1.60	1.75	2.95	3.56	1.92	1.78	4.55	1.32	1.52	1.95	24.47	2.35	550
2004	2.85	0.70	2.14	2.61	8.19	2.98	2.42	5.50	2.97	2.36	0.08	1.33	34.13	12.01	650
2005	2.33	0.67	0.82	0.73	3.62	7.55	3.37	3.24	1.77	3.48	2.06	1.65	31.29	9.17	400
2006	2.52	0.95	1.01	1.23	1.97	1.00	0.94	2.18	2.42	1.54	0.17	0.56	16.49	-5.63	300
2007	0.44	0.56	1.25	0.95	2.75	7.75	2.92	1.37	0.92	5.14	0.39	0.86	25.30	3.18	200
2008	0.25	1.29	0.46	2.17	1.56	3.93	4.33	3.63	3.06	2.37	2.00	1.47	26.52	4.40	275

42 year average precipitation 22.12"

*Precipitation amounts used are from the Roseau research site when possible and from the State Climatology High Density Network.

Table 2.
2003 Kentucky Bluegrass Variety Trial
Magnusson Research Farm- F7

Variety	seed lot#	Seed Yield					Harvest			% Heading		
		2006-8 % of mean	2006-8 mean(#/ac)	2008** (#/ac.)	2007 (#/ac.)	2006 (#/ac.)	Height(in.)	Date	Lodging*	8-Jun	17-Jun	24-Jun
Dragon	3607	150	720	682	640	838	24	15-Jul	2.5	2	43	93
SR 2284	3571	142	684	544	584	923	25	15-Jul	1.8	0	33	83
3.0009	3574	122	589	602	384	781	34	14-Jul	5	10	68	98
Brooklawn	3569	117	563	350	484	856	24	15-Jul	2	1	25	84
Pick 2	3582	114	549	526	404	716	24	23-Jul	2.3	1	48	89
A99-2674	3475	110	531	442	359	792	22	23-Jul	2	0	1	35
Awesome	3576	110	530	372	475	743	22	23-Jul	2	0	0	19
Perfection	3577	110	531	468	379	747	22	23-Jul	2.5	0	0	28
A99-2679	3564	108	520	491	328	740	21	23-Jul	2	0	1	36
Miracle	3550	107	515	493	415	638	22	21-Jul	3	2	30	90
A97-1289	3470	106	508	408	379	736	22	23-Jul	2	0	16	63
Kelly	3579	106	508	321	381	823	20	23-Jul	1.8	0	2	45
A99-2670	3474	103	495	426	363	696	19	23-Jul	2.3	0	2	44
Apollo	3586	103	495	421	392	671	22	23-Jul	2.5	0	10	55
Abbey	3608	103	495	330	379	776	19	20-Jul	1.5	0	7	48
Boutique	3570	100	480	386	328	727	21	18-Jul	2	1	29	78
Famous	3585	100	480	491	368	582	34	15-Jul	6.8	11	81	100
Midnight Star	3552	98	471	281	323	809	23	23-Jul	2.3	0	10	69
Raven	3584	98	469	381	326	700	21	23-Jul	1.8	0	1	48
Clearwater	3578	97	467	375	406	620	20	23-Jul	1.8	0	3	48
A99-2626	3590	97	465	457	357	582	22	23-Jul	2	0	0	38
Voyager	3551	96	461	535	346	502	34	15-Jul	4.3	0	35	91
A99-2628	3563	96	462	442	355	589	21	23-Jul	2.3	0	9	51
A99-2893	3565	92	441	326	277	720	20	23-Jul	1.8	0	0	29
Park	3540	88	425	502	366	406	33	15-Jul	6.5	11	76	100
Midnight	3539	85	409	323	314	591	22	23-Jul	2	0	2	24
A99-2950	3476	84	406	330	277	611	23	23-Jul	1.8	0	2	50
Pick 4	3583	83	399	263	297	636	25	20-Jul	1.8	1	18	75
3.0008	3573	76	365	366	161	569	24	18-Jul	2.5	1	23	68
A99-2235	3472	69	331	196	245	553	19	23-Jul	2	0	4	55
Washington	3587	65	311	381	232	319	34	15-Jul	6.5	5	69	100
Alene	3589	63	303	339	277	292	34	15-Jul	5.5	9	73	100
LSD @5% level		19	95	97	80	149	2	2	1.5	3	11	13
test mean yield			481	414								

*Lodging-1=Erect;9=flat

** 7 Varieties in original seeding were eliminated because of contamination in 2008.

Management:

120+35+45+18s applied 10/15/07

2 pts. Curtail+.75pt Banvel applied 9/13/07

2 oz. Tilt applied 5/28/08

Table 3.
2005 Kentucky Bluegrass Variety Trial
Field 7SE Magnusson Research Farm

Variety	Seed lot #	Seed Yield				2008						
		2007-8	2007-8	2008	2007	Harvest			% Heading			
		% of mean	mean	(#/ac.)	(#/ac.)	Height(in.)	Lodging*	Date	8-Jun	13-Jun	20-Jun	24-Jun
A99-3124	3700	133	531	506	555	23	2	23-Jul	0	0	16	48
Brilliant	3670	131	522	624	419	22	2	23-Jul	0	0	40	55
A99-2674	3475	127	507	482	533	22	2	23-Jul	0	0	13	40
A99-2893	3636	127	506	504	508	22	2	23-Jul	0	0	11	38
Miracle	3550	124	496	482	511	21	2	21-Jul	4	15	53	94
A99-2628	3634	124	496	513	479	22	2	23-Jul	0	0	19	45
A99-2670	3697	122	487	491	484	21	2	23-Jul	0	0	19	48
A99-2679	3737	121	482	508	455	22	2	23-Jul	0	0	18	45
Minnfine	3672	117	466	495	437	32	7.5	15-Jul	38	75	100	100
A99-2626	3633	113	450	502	399	22	2	23-Jul	0	0	15	43
Abbey	3608	112	448	248	649	20	1.8	19-Jul	0	1	19	53
Dragon	3671	108	432	390	473	25	2	15-Jul	3	13	59	94
Voyager II	3674	108	430	459	401	21	2	23-Jul	0	0	19	50
A97-1289	3470	97	388	357	419	24	1.8	23-Jul	0	3	19	70
Park	3540	95	379	363	395	32	5.3	15-Jul	14	33	96	100
Nuglade	3728	92	369	370	368	22	1.8	23-Jul	0	0	3	24
Nublue	3727	86	345	359	330	23	1.5	15-Jul	0	1	26	60
Midnight	3539	85	341	326	357	22	2	23-Jul	0	0	4	20
Sonic	3673	71	285	321	250	30	5.5	15-Jul	3	18	80	97
A99-2950	3699	68	272	285	259	24	2	23-Jul	0	1	25	58
A97-1436	3629	65	258	230	285	19	1.8	23-Jul	0	1	25	53
Midnight Star	3552	63	253	167	339	22	1	23-Jul	0	1	21	55
A99-2235	3696	61	243	207	279	19	2	23-Jul	0	1	31	60
Avalanche	3647	52	206	210	203	27	6	15-Jul	1	11	70	90
LSD @5% Level		12	50	68	65	2	0.9	2	3	5	10	9

* Lodging-1=erect ;9=flat

Management:

105+30+40+16s applied 10/15/07

2 pts. Curtail+.75pt Banvel applied 9/13/07

2 oz. Tilt applied 5/28/08

Table 4.
2003 Reed Canarygrass Variety Trial
Magnusson Reseach Farm-F7NW

Variety	Seed lot #	Seed Yield				
		3 Yr.ave % of mean	3 Yr.ave	2005 ----- lbs/A -----	2006	2008
Chiefton	3301	110	457	685	446	241
Venture	3493	112	465	662	384	348
Palaton	3433	103	430	689	343	256
Marathon	3406	108	449	615	415	317
Vantage	2925	88	367	595	312	194
Rival	3295	80	335	562	301	143
LSD @ 5% level		12	50	124	122	98
3 year average yield		417#/ac				

Harvest date= 7/16/08
 Experimental Design:RCB with 4 reps

Table 5.
2007 Red Clover Seed Production Variety Trial
Magnusson Research Farm -F7NW

Variety	seed lot#	Seed Yield (#/ac)
Freedom!	3819	343
Freedom!MR	3820	326
Start	3821	323
Remedy	3815	317
Marathon	3229	278
Kenland	3822	272
LSD @5%		67

Seeding date-5/18/07 under spring wheat
 Seeding rate=5#/ac
 Forage chopped and removed from all plots 6/18/08
 Experimental Design:RCB with 4 reps

Table 6.
2007 Tall Fescue Seed Production Variety Trial
Magnusson Research Farm -F7NW

Variety	Seed lot	2008		Lodging*		Height(in.) Harvest	Harvest Date	% Heading			
		Seed Yield	Seed Yield	7/16/2008	Harvest			6/17/2008	6/20/2008	6/24/2008	6/29/2008
		% of mean	(#/ac)								
2012-2-A	3830	137	1875	1.5	4.8	36	7/31/2008	0	4	19	78
2124-4-A	3833	135	1851	1.0	2.3	38	7/31/2008	2	12	29	79
Barvado	3800	133	1822	1.5	2.0	38	7/31/2008	3	12	36	85
2050-7-A	3832	124	1702	1.3	4.5	37	7/31/2008	0	7	24	79
2024-10-C	3831	123	1686	1.0	2.8	36	7/31/2008	1	11	33	84
Rembrandt	3834	117	1606	1.5	3.3	39	7/31/2008	0	6	23	71
Wolfpack	3718	116	1590	1.8	5.8	40	7/31/2008	0	7	20	86
Bingo	3714	112	1537	1.3	2.5	40	7/31/2008	1	4	29	83
Barcarella	3823	93	1276	2.8	4.3	43	8/1/2008	0	19	45	89
Drover	3828	90	1229	2.8	3.5	44	7/22/2008	14	41	74	97
BarElite	3824	80	1097	3.0	6.0	43	8/1/2008	0	2	12	81
Barolex	3826	78	1070	4.0	6.8	42	7/31/2008	0	1	6	83
Bariane	3825	77	1059	2.0	4.5	44	8/2/2008	0	1	9	75
PBR	3801	69	952	2.8	7.0	37	8/2/2008	0	0	0	23
Pradel(mf)	3829	47	647	6.5	7.0	43	7/22/2008	6	28	49	95
LSD @5% level		17	241	1.0	2	2	1	5	15	21	16

Average trial yield = 1372 #/ac.

Management:

Seeded 5/18/07 under wheat - 6#/ac.
 120+35+50+18s applied 10/15/07
 .75pt 2,4-D+.75 pt. Banvel applied 9/12/07
 Experimental Design:RCB with 4 reps
 * Lodging; 1=erect; 9=flat

Table 7.
2005 Tall Fescue Variety Trial
Magnusson Research farm- F5

Variety	Seed Lot#	Seed Yield (#/AC.)				Height(In.) at harvest
		2006-8*	2008	2007	2006	
Bingo	3714	564	388	537	767	37
Corgi	3715	621	299	651	912	34
Rebel Exeda	3716	710	390	845	894	36
SR 8250	3717	638	375	709	830	37
Wolfpack	3718	604	442	587	783	37
LSD @ 5% level		106	100	284	92	1

Sprayed 9/15/07 with 2 pt.Curtail + 3/4 pt.Clarity
 120+35+50+18s applied 10/15/07
 Experimental Design: RCB with 4 reps

Table 8.
2007 Perennial Ryegrass Seed Production Variety Trial
Magnusson Research Farm

Variety	Seed lot	Seed Yield		% Heading	
		% of mean	(#/ac)	6/20/2008	6/24/2008
Arctic Green(MHT)	3729	130	1617	9	41
Ragnar(p101)	3366	122	1512	28	81
Survivor	3848	114	1414	4	25
Brightstar SLT	3661	113	1396	18	56
Palmer V	3857	113	1396	21	63
Pennant III	3796	107	1325	7	41
Gator III	3856	106	1311	25	64
Ragnar II (p201)	3611	102	1264	28	75
Spreader III	3791	95	1182	7	24
NK-200	3538	94	1171	2	9
Barlennium	3797	91	1133	26	71
Affinity	3500	90	1110	35	81
Polar Green *	3372	81	1010	11	45
Barsprinter**	3827	79	977	0	2
Allstarz	3795	62	774	7	39
LSD @ 5%		17	210	7	16
Mean yield 1240#/ac					

Management:

Seeded 8/15/08 in fallow ground with spring wheat 10 oz. Quilt applied 6/30/08
 40# N urea applied 6/5/08 No grass control herbicide or growth regulator applied
 .75pt 2,4-D+.75 pt. Banvel applied 6/5/08 All plots badly lodged at harvest
 * poor germination Experimental Design:RCB with 4 reps
 **Barsprinter was spring seeded in the tall fescue variety trial

Table 9.
2007 Perennial Ryegrass Winter Hardiness Variety Trial
Magnusson Research Farm-Roseau and Keller- St.Paul

Variety	seed lot	Winter Injury*		
		Roseau**	St.Paul**	
		5/13/2008	4/22/2008	5/5/2008
Arctic Green(MHT)	3729	1	1	1.3
NK-200	3538	1	1.3	1.5
Survivor	3848	1	1	1.5
Spreader 3	3791	1	1.8	1.8
TQ x Spread sel.	3637	1	1.3	1.5
Polar Green	3372	1	1.3	1.5
WH x TQ sel.	3639	1	1.5	1.8
Brightstar SLT	3661	1	1	1
Ragnar II (P201)	3611	1	1	1.3
Ragnar (P101)	3366	1	1.3	1.3
Affinity	3500	1	1.3	1
Ribeye(annual)	3689	8.1	7.5	7.9
LSD @5%		0.1	0.8	0.9

*Winter Injury; 1=no injury;9=dead

**Roseau plots seeded 8/13/07;St.Paul seeded 9/10/07

Plots seeded in bare tilled ground with no cover

Experimental design= RCB with 4 reps

Table 10.
Applications of Nitrogen Fertilizer Rates and Sources to 'Park' Kentucky Bluegrass
At 2 Locations-Rice Farms- Roseau and Helmstetter Farm- Lake of the Woods

Source	Nitrogen Rate	Seed Yield (#/ac.)			Rice Harvest	
		Mean	Helmstetter	Rice	Lodging	Ht.(in.)
1 None	0	70	60	80	1	27
2 Urea(46-0-0)	60	279	232	325	2.3	33
3 Urea(46-0-0)	100	417	410	424	4.3	28
4 Urea(46-0-0)	140	484	482	486	7.3	30
5 None	0	62	54	71	1	26
6 Amm. Nitrate(34-0-0)	60	329	321	337	3.5	33
7 Amm. Nitrate(34-0-0)	100	482	511	453	5.8	36
8 Amm. Nitrate(34-0-0)	140	486	533	439	6.5	36
LSD @ 5% level		74	132	116	1.6	11

* Lodging-1=erect; 9=flat

All fertilizer applications made 10/13/07

0-30-40 applied to all plots

Experimental design: RCB with 4 replications

Soil Test Nitrate Nitrogen #/acre:

	0 - 6 inches	6 - 24 inches	P	K	S	PH
Rice	6	2	18	252	22	8.4
Helmstetter	10	16	20	172	22	8.1

Table 11.
2008 Kentucky Bluegrass Fertility Trials Data Summary
of Applications made at 3 locations in 2007

Treatment Explanation	Seed yield - % of mean		
	Helmstetter*	Rice**	Test Plot***
Very early 15+70+100+remainder Oct.13	126	104	102
All fertilizer mid-October	83	115	110
All fertilizer mid-October + amm.sulfate	88	132	105
Urea only Oct.13	86	66	99
Very early AMS +remainder Oct.13	103	124	111
All fertilizer- Late Oct.	na	59	72
Early 15+70+100+AMS-remainder Oct.13	107	na	na
Early 15+70+100-remainder+ AMS mid Oct.	87	na	na
All fertilizer + AMS- early Oct.	119	na	na
LSD @5% level	27	12	17
Location mean-#/ac.	496	423	305

* Park bluegrass with 130#/ac. Nitrogen

** Park bluegrass with 100#/ac. Nitrogen

***Midnight bluegrass with 130#/ac. Nitrogen

Experimental design: RCB with 4 replications

Table 11a.
2007 Kentucky Bluegrass Fertility Timing Trial
 F5 - Magnusson Research Farm - Variety 'Midnight'

	Treatment	Date	Seed Yield (#/ac.)	Harvest Ht.(in.)	Treatment Explanation
1)	15+70+100 115+0+0	8/1/2007 10/12/2007	312	25	very early 15+70+100+remainder Oct. 12
2)	15+70+100 115+0+0	10/12/2007 10/12/2007	335	25	Normal(check) fertility-Roseau
3)	15+70+100 20+0+0+22s 95+0+0	10/12/2007 10/12/2007 10/12/2007	319	25	Normal(check) fertility+AMS-LOW
4)	130+0+0	10/12/2007	303	25	Urea only Oct. 12
5)	20+0+0+22s 15+70+100 95+0+0	8/7/2007 10/12/2007 10/12/2007	339	26	AMS very early+remainder Oct. 12
6)	15+70+100 115+0+0	10/31/2007 10/31/2007	219	24	All fertilizer- Late Oct.
LSD @ 5%			51	1	

Management:

All plots received 130 #/ac. Nitrogen
 Higher than normal phosphorus and potash applied as not to be limiting
 Experimental design: RCB with 4 replications
 Plot size= 8' x 15'. Fertilizer weighed and hand spread on each plot.

Fertility sources:

Ammonium sulfate 21-0-0-24
 All other nitrogen- 46-0-0
 Phosphorous 0-46-0
 Potash - 0-0-60

Soil test Results (#.ac)

pH	P	K	S	N 0-6"	N 6-24"
8.1	26	242	10	2	6

Table 11b.**2007Kentucky Bluegrass Fertility Timing Trial**

Rice Farms-1 Mile west of Magnusson Research Farm-Rosea: Variety 'Park'

	Fertilizer Rate	Application Date	Seed Yield (#/ac.)	Harvest Ht.(in.)	Lodging at Harvest	Treatment Explanation
1)	15+70+100 85+0+0	8/1/2007 10/12/2007	439	36	5.8	very early 15+70+100+remainder Oct.12
2)	15+70+100 85+0+0	10/12/2007 10/12/2007	486	37	7.5	Normal(check) fertility-Roseau
3)	15+70+100 20+0+0+22s 65+0+0	10/12/2007 10/12/2007 10/12/2007	558	37	7.3	Normal(check) fertility-LOW ammonium sulfate added
4)	100+0+0	10/12/2007	279	33	4.8	Urea only Oct.12
5)	20+0+0+22s 15+70+100 65+0+0	8/7/2007 10/12/2007 10/12/2007	526	36	8	AMS very early+remainder Oct.12
6)	15+70+100 85+0+0	10/31/2007 10/31/2007	250	37	5.3	All fertilizer applied late Oct.
LSD @5%			85	3	2	

Management:

All plots received 100 #/ac.Nitrogen

Higher than normal phosphorus and potash applied as not to be limiting

Experimental design: RCB with 4 replications

Plot size= 8' x 15'. Fertilizer weighed and hand spread on each plot.

Fertility sources:

Ammonium sulfate 21-0-0-24

All other nitrogen- 46-0-0

Phosphorous 0-46-0

Potash - 0-0-60

Soil test Results (#.ac)

pH	P	K	S	N 0-6"	N 6-24"
8	14	168	10	5	6

Table 11c .

2007 Kentucky Bluegrass Fertility Timing Trial

Helmstetter Farms - Roosevelt, MN (Lake of the Woods): Variety 'Park'

			Seed Yield (#/ac.)	Harvest Ht.	Harvest Lodging	Treatment Explanation
1)	15+70+100 115+0+0	8/14/2007 10/13/2007	627	37	7	very early 15+70+100- remainder Oct.13
2)	15+70+100 115+0+0	10/13/2007 10/13/2007	413	38	6.5	Normal(check) fertility-Roseau
3)	15+70+100 20+0+0+22s 95+0+0	10/13/2007 10/13/2007 10/13/2007	435	36	6	Normal(check) fertility-LOW (+AMS)
4)	130+0+0	10/13/2007	428	37	6	Urea only Oct.13
5)	20+0+0+22s 15+70+100 95+0+0	8/14/2007 10/13/2007 10/13/2007	513	35	6.8	very early AMS +remainder Oct.13
6)	15+70+100 20+0+0+22s 95+0+0	9/10/2007 9/10/2007 10/13/2007	531	37	6.3	early 15+70+100+AMS-remainder Oct.13
7)	15+70+100 20+0+0+22s 95+0+0	9/10/2007 10/13/2007 10/13/2007	433	36	6.8	early 15+70+100 remainder + AMS Oct.13
8)	15+70+100 20+0+0+22s 95+0+0	10/1/2007 10/1/2007 10/1/2007	589	34	7.3	All fertilizer- early Oct.
LSD @5%			135	3	NS	

Management:

All plots received 130 #/ac.Nitrogen
Higher than normal phosphorus and potash applied as not to be limiting
Experimental design: RCB with 4 replications
Plot size= 8' x 15'. Fertilizer weighed and hand spread on each plot.

Fertility sources:

Ammonium sulfate 21-0-0-24
All other nitrogen- 46-0-0
Phosphorous 0-46-0
Potash - 0-0-60

Soil test Results (#.ac)

pH	P	K	S	N 0-6"	N 6-24"
7.8	20	118	24	2	6

Table 12.
Fungicides Applied to Kentucky Bluegrass at 3 Locations in Northern Minnesota in 2008

Treatment	Timing	Rate	Seed Yield(#/ac.)				Tveit		
			Test plots	Malung	LOW	Mean	Mildew 7/14/2008	Harvest*** ht.(in.)	Harvest*** Lodging
Tilt	optimum	3 oz.	285	407	125	273	1	31	3.1
	early+late	2 + 2	315	464	175	318	1	31	2.6
BASF 556	optimum	9 oz.	268	508	110	295	1	32	3.1
Headline+Headline	early+late	6+ 6 oz.	277	532	140	316	1	33	2.6
Absolute*	optimum	6 oz.+1%MSO	348	473	164	328	1	33	2.8
Absolute+Absolute*	early+late	4 oz.+ 4 oz.	303	464	143	303	1	31	2.9
Quilt	optimum	10 oz.	309	604	181	365	2	34	3.3
No Treatment		5 oz	318	502	145	322	2	34	3.1
Proline**	optimum		294	na	na	na	na	na	na
LSD @5% level			61	NS	NS	58	NS	2	0.7

* 1% MSO added to this treatment

** Proline only applied at Magnusson Research Farm

*** Mean of 3 locations. Lodging, 1=none;9=flat

B.Tveit-LOW area: var. 'Park'

1st split application 5/31/08 8:00am 56F clear calm heavy dew
vegetation 8"-12" high trace heading
2nd split application 6/14/08 8:00pm 61F wind wsw 5-10
vegetation 12"-18" fully headed
Optimum application 6/4/08 7:00pm pldy 65F
vegetation 10" high 30% heading

Magnusson Farms- Malung area: var. 'Park'

1st split application 5/28/08 5:00pm clear 70F wind 0-5 sw
vegetation 5"-6" high trace heading
2nd split application 6/14/08 6:00am clear calm 48F
vegetation 12"-18" 80% headed
Optimum application 6/7/08 9:00pm clear 65F wind 0-5ssw
vegetation 12"-18" 10% headed

Magnusson Research Plots: var. 'Midnight'

1st split application 5/27/08 8:30pm 62F clear wind 0-5 sse
vegetation 3"-4" high
2nd split application 6/22/08 10:30am 67F clear calm
bluegrass 30% headed
Optimum application 6/13/08 9:00pm pldy 65F
bluegrass trace heading

Absolute 2.18#+2.18# tebuconazole+triflozystrobin
Headline 2.09# pyraclostrobin
Tilt 3.6# propiconazole
BASF 556 1.08#+.67# pyraclostrobin+ metconazole
Quilt 1.04# +.62# propiconazole+azoxystrobin
Proline 4# prothioconazole

Table 13.							
2007-8 Post Emergent Foxtail Barley(Hordeum jubatum) control							
A99-2626 Ky.bluegrass*- Magnusson Research Farm F6W							
				2008			
Treatment	Rate***	Timing	Seed Yield (#/ac)	% control foxtail barley	crop injury**	Height(in.)	
No Treatment			435	0	0	22	
Beacon	.25oz.+.25oz.	9/14/07&5/28/08	343	30	7	18	
Everest	.61 oz.	9/14/2007	346	15	2	20	
Beacon	.5 oz.	5/21/2008	564	78	3	20	
Beacon	.5 oz.	5/28/2008	473	75	4.5	20	
Beacon	.5 oz.	6/8/2008	422	55	3.5	20	
Everest	.61 oz.	5/28/2008	616	78	2.5	22	
Everest	.61 oz.	6/8/2008	511	85	1	22	
LSD @5% level			238	42	2	4	
5/21 treatments- wind NW @ 8mph wet conditions. Bluegrass and foxtail barley 2"-4" height							
6/8 treatments - wind calm, 60F. Bluegrass 6"-8" and foxtail barley tillering and 8"-10" height							
Plot size 10' x 30' . Applications made with bicycle sprayer 12.5 GPA							
.75pt. Banvel+.75pt. 2,4-D applied 9/12/07. Fertilized with 120+35+50+18s 10/15/07.							
Experimental.Design: RCB with 2 reps							
*A99-2626 is a bluegrass hybrid variety seeded in 2006 on the Magnusson Research farm							
** Visual injury to bluegrass 1=none;9=severe							
***All treatments had .25% NIS(Preference) added							

Table 14.
Herbicides Applied to 'Park' Kentucky Bluegrass in the Spring
At 2 Northern Minnesota Locations- 2008

Treat#	Trade name	Application Rate	Seed Yield(#/ac.)			Mean Yield % of check	Harvest			Harvest Visual Weed Control ***				Tvelt* Crop Injury 21-Jun
			Magnusson	Tvelt*	Mean		Lodging both loc	Lodging 9=flat	height** (in.)	dandelion	sw. clover	c. thistle	hawkbeard	
1	Huskie(EC)	13.5 oz.	381	247	314	108	4.3	3.0	38	2.0	1.7	1.7	1.7	0.0
2	Huskie(EC)	27 oz.	354	238	296	102	4.2	3.3	38	3.0	2.3	2.7	2.3	0.0
3	Bronate Advance	1 pt.	351	169	260	89	3.3	3.0	37	3.0	2.3	2.7	2.7	0.0
4	MCPE	.75pt	291	NA	NA	NA	NA	2.3	36	3.0	2.0	2.7	2.3	0.0
5	2,4-D amine	.75 pt.	268	NA	NA	NA	NA	2.3	39	2.7	1.7	2.0	1.7	0.0
6	2,4-D ester	.75 pt.	309	NA	NA	NA	NA	3.0	37	3.7	3.0	3.0	2.0	0.0
7	Buctril	1 pt.	318	NA	NA	NA	NA	3.0	37	1.7	0.0	1.7	0.7	0.0
8	Banvel	.75 pt.	187	NA	NA	NA	NA	2.7	34	2.0	5.0	3.0	3.7	0.0
9	Banvel+2,4-D amine	.75+.75	274	155	214	74	3	2.3	36	2.7	5.0	3.7	4.3	0.0
10	Beacon**	.4oz.	327	211	269	92	3	2.7	34	3.0	4.0	3.7	2.3	2.0
11	Beacon+2,4-D amine**	.4 oz+.75pt	345	181	263	90	2.7	2.6	34	3.3	4.7	3.7	3.3	2.0
12	Curtail	1.5 pt.	401	196	299	103	3.3	2.3	37	3.3	3.7	3.7	3.7	0.0
13	Everest**	.61 oz	380	137	258	89	3	2.7	35	1.7	1.0	1.0	1.0	3.0
14	Express TotalSol+2,4-D amine	.15oz+.75 pt	363	175	269	92	4.5	2.7	37	3.3	2.0	2.0	2.0	0.0
15	Stinger	6 oz.	384	NA	NA	NA	NA	2.7	37	3.7	3.7	4.0	1.3	0.0
16	Callisto	3 oz.	241	140	190	65	4	2.3	37	1.7	0.3	2.7	2.0	0.0
17	Balance Flex**	4 oz.	187	187	187	64	4.2	2.7	38	2.3	3.3	3.7	3.3	3.0
18	Rage D-tech	1.5 pt.	398	250	324	111	4	2.7	37	4.0	3.0	3.0	3.3	0.0
19	Paramount**	12 oz.	268	250	259	89	5.5	3.3	37	3.3	4.3	4.0	3.0	3.0
20	WideMatch	1 pt.	425	199	312	107	4.5	3.7	37	3.3	4.3	3.7	2.7	0.0
21	WideMatch+2,4-D amine	1 pt.+.75pt amine	345	211	278	96	4.3	3.0	35	3.7	4.0	4.3	3.0	0.0
22	Starane	1 pt.	363	NA	NA	NA	NA	3.0	39	2.7	4.7	3.0	1.7	0.0
23	Alm 2EC	1.5 oz.	262	NA	NA	NA	NA	2.3	38	1.7	1.0	2.3	1.3	0.0
24	No Treatment	none	321	262	291	100	4.7	3.7	37	0.0	0.0	0.0	0.0	0.0
LSD @5% level			132	122	95	35	1.3	1.1	3	1.1	1.2	1.2	1.3	

Tvelt Location north of Roosevelt:

Harvest Date- 7/14/08

Treatments applied 5/31/08 11:00am overcast wind calm

Bluegrass 10" height and 5% heading

A wind/hail event before harvest that reduced seed yield

Magnusson location Malung area south of Roseau:

Harvest Date-7/15/08

Treatments applied 5/23/08 wind 3-6mph ESE temp. 50F

Bluegrass 8" tall in late boot stage

Experimental Design: RCB with 4 reps

* NA treatments not applied at Tvelt location

**Weed control- 0=none; 5=complete kill

** These treatments had visible effects on plant growth 21DAT

*** Magnusson location data

Treat#	Trade name	Adjuvants	common name	Active ingredient/gal.
1	Huskie(EC)		pyrasulfotole+bromoxynil+BCS safener	3.3%+26.3%
2	Huskie(EC)		pyrasulfotole+bromoxynil+BCS safener	3.3%+26.3%
3	Bronate Advance		MCPA+bromoxynil	2.5#+2.5#
4	MCPE		MCP Ester	3.7#
5	2,4-D amine		2,4-D Amine	3.8#
6	2,4-D ester		2,4-D ester	3.8#
7	Buctril		bromoxynil	2#
8	Banvel		Dicamba	4#
9	Banvel+2,4-D amine		Dicamba+2,4-D	4#+3.8#
10	Beacon	.25%NIS	primisulfuron	75%
11	Beacon+2,4-D amine	.25%NIS	primisulfuron+2,4-D	75%+3.8#
12	Curtail		2,4-D+clopyralid	2#+.38#
13	Everest	.25%NIS	flucarbazone .027#	70%
14	Express TotalSol+2,4-D amine		tribenuron .014#+2,4-D	50%+3.8#
15	Stinger		clopyralid	3#
16	Callisto	1% COC	mesotrione	4#
17	Balance Flex		Isoxaflutole+safener	
18	Rage D-tech(Aim+2,4-D ester)	.25% NIS	carfentrazone+2,4-D Ester	.13#+3.8#
19	Paramount	1% COC	quincloroc	75%
20	WideMatch		clopyralid+fluroxypyr	.75#+.75#
21	WideMatch+2,4-D amine		clopyralid+fluroxypyr+2,4-D	.75#+.75#+3.8#
22	Starane		fluroxypyr	1.5#
23	Alm 2EC	.25%NIS	carfentrazone	2#
24	No Treatment			

Table 15.							
2007 Date of Seeding- Arctic Green perennial ryegrass							
F1 Magnusson Research Farm-Roseau,Mn							
	Tilled		Wheat stubble*		Mean of both treatments		
Seeding	Yield	Dry matter	Yield	Dry matter	Yield	Dry matter	
Date**	(#/ac)	(T/ac.)	(#/ac)	(T/ac.)	(#/ac)	(T/ac.)	
8/23/2007	1508	3.03	1606	2.98	1557	3.00	
8/30/2007	2150	3.95	1240	2.77	1695	3.36	
9/6/2007	1436	2.26	1115	2.61	1276	2.43	
9/13/2007	1383	2.20	874	2.08	1128	2.14	
9/20/2007	946	1.48	839	1.69	892	1.58	
9/27/2007	526	1.02	491	0.77	508	0.89	
10/4/2007	36	0.18	196	0.55	116	0.37	
LSD @5%	606	0.96	528	0.47	319	0.63	
Perennial ryegrass was directly seeded into tilled ground or wheat stubble.							
*Stands in wheat stubble are variable							
** Rows were watered after seeding							

Table 16.					
Growth Regulator and Fertility Timing on 'Artic Green' Perennial Ryegrass					
Seeded May 2008 under Spring Wheat -Magnusson Research farm					
		Seed Yield		Harvest	
		% of mean	(#/ac.)	Lodging*	Height(in.)
1) no growth regulator+ early fert.		97	1141	8.7	26
2)no growth regulator + late fert.		92	1082	7.7	27
3)Apogee fall + early fert.		97	1133	8.0	27
4)Apogee fall + late fert.		91	1067	8.0	27
5)Apogee spring + early fert.		113	1320	5.0	23
6)Apogee spring + late fert.		110	1290	5.0	23
LSD @5% level		19	232	1.6	2
*Lodging-1=none;9=flat					
Management:					
Experimental Design: RCB with 3 reps					
Fertilizer Rate=100+33+47+15s					
Early fertility applied 9/5/07; N,P,K,S 33-33-47-15s					
Remainder of Nitrogen (67#) applied 5/28/08					
Late fertility = all fert applied 10/15/07 100-33-47-15s					
Apogee treatments =					
Fall	12 oz.+4pts. 28% + .25%NIS		9/16/2007		
Spring	6 oz.+4 pt. 28%+.25%NIS		6/15/2008		
Harvest date 8/14/08					
Table 17.					
Growth Regulators applied to spring seeded 'Arctic Green' Perennial ryegrass					
Magnusson Research plots					
		Application	Seed	Harvest	
Treatment	Rate/adjuvant	timing	Yield(#/ac)	Lodging	Ht.(in.)
No treatment			1053	8.5	27.0
Apogee	8oz.+2.5%Class Act NG	4-Jun	1293	3.0	20.0
Apogee	4oz.+2.5%Class Act NG	4-Jun	1512	5.5	23.0
Palisade	1 Pt.	4-Jun	1151	4.0	22.0
Apogee	10oz.+2.5%Class Act NG	22-Jun	1169	3.5	21.5
LSD @5% level			NS	2.5	3.5
Management:					
Seeded 5#/ac under spring wheat 5/24/07					
Fertility- 100+30+40+15s applied 10/15/07					
3/4 pt. 2,4-D + 3/4 pt. Banvel					
10 oz.+ .25%NIS Assure II					
Experimental Design:RCB with 2 reps					
6/4/2008	ryegrass 2-3 nodes wind nw 5mph 55F				
6/22/2008	ryegrass 50% headed				
calm winds 11:00 am 72F					
Harvested-8/8/08					

Table 18.

Fungicides Applied to Perennial Ryegrass at 2 Northern Minnesota Locations

Trade Name	Application timing	Application Rate	Additive	Seed Yield(#/a.)			Magnusson	
				Tveit	Magnusson	2 location Mean	Harvest color*	Harvest height(in.)
No Treatment				1448	1083	1266	6.5	26
Absolute	Optimum	7.7 oz.	1%COC	1332	888	1110	6.0	24
Quilt	Optimum	10 oz.		1264	867	1066	6.5	23
Tilt	Optimum	4 oz.		1264	999	1132	6.0	24
Twinline	Optimum	9 oz.		1427	959	1193	7.0	25
Proline	Optimum	5 oz.		1398	879	1139	7.0	25
Absolute	2x	5 oz.	1%COC	1392	1017	1205	6.5	26
Quilt	2x	8 oz.		1347	950	1149	6.0	25
Twinline	2x	6 oz.		1579	1017	1290	7.0	26
Folicur 3.6	2x	3 oz.		1282	1115	1199	6.0	24
Headline	2x	6 oz.		1359	1151	1255	5.0	24
Tilt	2x	3 oz.		1305	941	1123	5.0	22
LSD @5% level				236	NS	NS	1.3	3

*Color- 1=light green;9=dark green

Magnusson Treatment Timing:

2X First application 6/14/08 2-3 nodes flag-early boot 6-10" tall
7:30am 52F wind 0-5 wsw

Second application 7/5/2008

Variety- Arctic Green Perennial Ryegrass- F1 Magnusson Research Farm

Optimum 7/4/08 mostly headed with some pollen shedding 20-24" tall
8:00am 63F wind 5-10ssw

Experimental Design: RCB with 2 reps

Harvested 8/8/08

Tveit Treatment Timing:

2X First application 6/14/08 2-3 nodes flag-early boot 4-8" tall
7:00pm 64F wind 5-15 wsw

Second application 7/6/2008

Optimum 7/3/08 mostly headed with some pollen shedding 16-22" tall
6:30pm 74F wind 0-5w

Variety- Gator III Perennial Ryegrass- Tveit Farm north of Roosevelt

Experimental Design: RCB with 3 reps

Harvested 8/13/08

Trade Name	common name	Active Ingredient (#/gal.)
Absolute	tebuconazole+triflozystrobin	2.18#+2.18# Folicur+Flint
Headline	pyraclostrobin	2.09#
Tilt	propiconazole	3.6#
Twinline	pyraclostrobin+ metconazole	1.08#+.67# Headline+Caramba
Quilt	propiconazole+azoxystrobin	1.04# +.62# Tilt+Quadris
Proline	prothioconazole	4#
Folicur	tebuconazole	3.6#

Table 19.
2007-8 Grass/Wild Oat Control in Perennial Ryegrass
var. Arctic Green(MHT) F1 Magnusson Research Farm-Roseau,Mn

Treatment	Rate/adjuvant	Application Date	Seed yield		Harvest height(in.)	% Control	
			% of check	(#/ac)		Foxtail barley	Volunteer wheat
No treatment			100	1253	25.5	0	0
Achieve L	8 oz.+5%Supercharge+2.5%AMS	6/5/2008	91	1146	23	10	0
Assert	1.2 pts.+1%COC	6/5/2008	69	865	23.5	20	10
Nortron	2 pts.	10/11/2007	114	1423	25.5	97	97
Nortron	2 pts.	5/20/2008	102	1276	23.5	70	88
Prowl 3.3	3.5 pts.	10/11/2007	108	1360	23.5	25	50
Prowl 3.3	3.5 pts.	5/20/2008	98	1222	23.5	40	55
LSD @ 5% level			35	430	NS	51	30

Management:

Seeded 5#/ac into wheat stubble 8/25/07
 Fertility- 100+30+40+15s applied 10/15/07
 3/4 pt. 2,4-D + 3/4 pt. Banvel
 Experimental Design:RCB with 2 reps

10/11/2007 Most ryegrass emerged with 2-3 leaves
 5/20/2008 Ryegrass vegetative-2-3" height
 6/5/2008 ryegrass 2-3 nodes

Trade name	common name	Active ingredient (#/gal.)
Achieve L	tralkoxydim	3.33#
Assert	imazamethabenz	2.5#
Prowl	pendimethalin	3.3#
Nortron	ethofumesate	1.0#

Table 20.
Effects of Late Spray applications applied to Perennial Ryegrass
var. Arctic Green(MHT) Magnusson Research Farm-Roseau,Mn

Treatment/Rate/Adjuvants	Seed Yield	
	% of check	(#/ac)
No Treatment	100	1192
2,4-D ester 1pt+ Banvel 1 pt.+ 10 oz. Apogee+2.5% Class Act NG+ Quilt 10 oz.	125	1490
2,4-D ester 1pt+ Banvel 1 pt.+ Quilt 10 oz.	106	1267
2,4-D ester 1 pt.+ Banvel 1 pt.	103	1228
2,4-D ester 1 pt.+ Banvel 1 pt. +Assure II 10 oz.+ .25%NIS+ Quilt 10oz.	82	978
LSD @ 5% level		19 244

Treatments applied: 6-23-08, Ryegrass 12-16 inches tall, 30% headed, Temp 70F, Wind ssw 0-5
 10 oz. Assure II + .25%NIS applied to all plots 6/4/08
 Fertility- 100+30+40+15s applied 5/10/08
 Experimental Design: RCB with 3 reps

Table 21.
2008 Weed Control Applied to Arctic Green Perennial Ryegrass
F1 Magnusson Research Farm- Roseau, Mn

Treat#	Trade name	Rate	Adjuvant	Seed Yield %check	Seed Yield (#/ac.)	Harvest height (in.)	7/4/2008 % height reduction	7/4/2008 % head reduction	7/4/2008 % control of volunteer wheat
1	Banvel+2,4-D amine	.75+.75		103	1430	27	0	0	0
2	Huskie	13.5 oz.		104	1445	27	0	0	0
3	Huskie	27 oz.		93	1290	26	0	3	0
4	Bronate Advance	1 pt.		109	1510	27	0	0	0
5	Curtail	1.5 pt.		106	1463	27	0	0	0
6	Callisto	3 oz.	1% COC	101	1400	27	0	0	25
7	Balance Flex	4 oz.		97	1341	26	0	0	8
8	Rage D-tech	1.5 pt.	.25% NIS	98	1353	28	0	0	0
9	WideMatch+2,4-D amine	1pt+.75pt.		94	1299	28	0	0	0
10	Banvel+2,4-D amine+Assure II	label rates	.25%NIS	103	1433	26	0	2	100
11	Banvel+2,4-D amine+Assure II+Apogee	label rates	2.5% Class Act NG	112	1555	23	18	7	80
12	Banvel+2,4-D amine+Apogee	label rates	2.5% Class Act NG	108	1490	23	22	7	33
13	Assure II+Apogee	label rates	2.5% Class Act NG	97	1338	22	53	7	90
14	Assure II	10 oz.	1% COC	53	740	23	17	45	98
15	Assure II	10 oz.	.25%NIS	79	1100	25	5	17	100
16	Apogee	8 oz.	2.5% Class Act NG	108	1496	22	40	3	55
17	Paramount	12 oz.	1% COC	93	1290	26	0	0	0
18	Nortron	2 pt.		95	1320	25	1	3	53
19	Assert	1.2 pt.	.25%NIS	87	1210	27	0	2	0
20	Achieve liquid	.5 pt.	.25%Supercharge+2.5%ams	68	937	24	7	22	35
21	Avenge	3 pt.	.25% NIS	94	1302	24	0	3	8
22	No Treatment	none		100	1386	27	0	2	0
LSD @ 5% level				20	262	2	9	9	26

Plot treatments applied 6/14/2008. Sunny 55F wind wsw 5-10mph Ryegrass 2-3 nodes and 6-10" tall
Treatments in BOLD(#14-#21)= .75pt 2,4-D + .75pt. Banvel applied separately 6/18/08 for general broadleaf weed control
 Harvested 8/13/08
 Experimental Design: RCB with 3 reps

Trade Name	Common name-active ingredients	Active	Packaged Mix
Huskie	pyrasulfotole+bromoxynil+ safener	3.3#+26.3%	Pyrasulfotole+Buctril+BCS safener
Bronate Advance	MCPA+bromoxynil	2.5#+2.5#	MCPA+Buctril
Banvel+2,4-D an	dicamba+2,4-D	4#+3.8#	
Curtail	2,4-DA+clopyralid	2#+.38#	2,4-D amine+Stinger
Callisto	mesotrione	4.0#	
Balance Flex	Isoxaflutole+safener		
Rage D-tech	carfentrazone+2,4-D ester	.13#+5.92#	Aim+2,4-D ester
Paramount	quinclorac	75%DF	
Assure II	quizalofop	.88#	
WideMatch	clopyralid+fluroxypyr	.75#+.75#	Stinger+Starane
Assert	imazamethabenz	2.5#	
Callisto	mesotrione	4.0#	
Nortron SC	ethofumesate	1.0#	
Avenge	difenzoquat	2.0#	
Achieve liquid	tralkoxydim	3.33#	
Apogee	prohexadione	27.5%DF	

Table 22.
2008 Weed Control applications to Gator III Perennial Ryegrass
Byron Tveit farm- north of Roosevelt,Mn

Treat#	Trade Name	Application		Seed Yield		Harvest height(in.)
		Rate	adjuvant	%check	(#/ac)	
1	Banvel+2,4-D amine	.75pt.+75pt.		108	1213	27
2	Huskie	13.5 oz.		116	1308	26
3	Huskie	27 oz.		127	1427	25
4	Bronate Advance	1 pt.		111	1255	27
5	Curtail	1.5 pt.		110	1237	28
6	Callisto	3 oz.	none	123	1386	26
7	Callisto	3 oz.	1% COC	114	1287	27
8	Balance Flex	4 oz.		111	1255	26
9	Rage D-tech	1.5 pt.	.25% NIS	112	1264	25
10	WideMatch+2,4-D amine	1pt.+75pt.		95	1073	27
11	Banvel+2,4-D amine+Puma+Apogee	label rates	2.5% Class Act NG	114	1287	25
12	Banvel+2,4-D amine+Apogee	label rates	2.5% Class Act NG	126	1424	26
13	Banvel+2,4-D amine+Puma	label rates		113	1270	26
14	Paramount	12 oz.	1% COC	105	1186	26
15	Rimfire	2 oz.	1% MSO	70	794	24
16	Assert	1.2 pt.	.25%NIS	89	1008	26
17	Nortron	2 pts.		118	1326	27
18	Avenge	3 pts.	1%COC	110	1243	27
19	Puma	10 oz.		121	1365	26
20	Apogee	8 oz.	2.5% Class Act NG	134	1513	25
21	Puma+Apogee	label rates	2.5% Class Act NG	109	1234	26
22	No Treatment	none		100	1127	26
LSD @5% level				13	162	2

Experimental Design: RCB with 3 reps
Harvested 8/13/08

Treatments in Bold(14-21) applied 6/15/08 3:30pm 68F Pctdy wind wsw 5-15 2-3 nodes and 4-8" tall

These treatments also had 3/4 pt.2,4-D + 3/4pt. Banvel applied 6/4/08 for broadleaf weed control

All other treatments also applied 6/4/08 wind nne 5-10mph 55F 6:00pm ground damp not wet--g.stage=vegetative

Trade Name	Common name-active ingredients	Active	Packaged Mix
Huskie	pyrasulfotole+bromoxynil+safener	3.3%+26.3%	Pyrasulfotole+Buctril+BCS safener
Bronate Advance	MCPA+bromoxynil	2.5#+2.5#	MCPA+Buctril
Banvel	dicamba	4#	
2,4-D amine	2,4-D	3.8#	2,4-D amine+Stinger
Curtail	2,4-DA+clopyralid	2#+.38#	2,4-D amine+Stinger
Callisto	mesotrione	4.0#	
Balance Flex	Isoxaflutole+safener		
Rage D-tech	carfentrazone+2,4-D ester	.13#+5.92#	Aim+2,4-D ester
Paramount	quinclorac	75%DF	
Rimfire	propoxycarbozone +mesosulfuron	8.14%+2.03%	Olympus+Silverado
WideMatch	clopyralid+fluroxypyr	.75#+.75#	Stinger+Starane
Assert	imazamethabenz	2.5#	
Callisto	mesotrione	4.0#	
Nortron SC	ethofumesate	1.0#	
Avenge	difenzoquat	2.0#	
Puma	fenoxypyr	1.0#	
Apogee	prohexadione	27.5%DF	