

PROGRESS REPORT ON GRASS SEED PRODUCTION RESEARCH

prepared by

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**Table 1. Monthly and year end total precipitation*
Roseau, Mn 1967-2007.**

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Yearly Total	DEVIATION FROM AVERAGE	Park' blg. test plot 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	-2.86	
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	7.91	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	2.29	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	3.26	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	-3.70	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	-2.92	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	-0.60	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	4.45	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	-3.97	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	-6.19	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	-2.58	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	-1.40	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	-4.56	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	-2.87	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	1.58	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	-1.81	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	-0.07	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	-4.59	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	3.03	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	-2.64	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	-4.10	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	-5.09	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	-0.31	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	-10.34	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	8.27	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	-1.40	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	-0.23	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	-3.42	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	-0.07	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	3.97	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	-1.35	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	2.92	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	0.87	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	6.21	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	-3.23	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	3.80	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	2.45	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	12.11	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	9.27	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	-5.53	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	3.28	175
41 year average precipitation													22.02"		

*Precipitation amounts used are from the Roseau research site when possible and from the National Weather Service or the High Density Network.

Table 2.
2001 Kentucky Bluegrass Variety Trial
Magnusson Research Farm - Roseau, MN Field F5

Variety	Seed lot #	2007 Seed Yield (#/Ac.)				% of Mean	Seed Yield				Seed source	
		Visual Estimate		Actual			2003-6	2003	2004	2005		2006**
		Desiccate*	burn*	Desiccate*	burn*		#/ac.	#/ac.	#/ac.	#/ac.		
Minnfine	3252	850	850	723	633	142	680	1077	564	535	Check variety	
Park	3021	700	NA	343	NH	132	611	1084	629	339	Check variety	
A99-2981	3420	550	700	NH	NH	133	555	852	752	531	Rutgers/U of M	
A99-2893	3419	650	1000	NH	NH	NA	682	934	448	NH	Rutgers/U of M	
Abbey	2606	300	475	NH	NH	NA	658	781	591	NH	Check variety	
A99-2628	3417	650	950	NH	NH	NA	685	876	439	NH	Rutgers/U of M	
A99-2626	3416	550	750	281	450	NA	709	760	421	NH	Rutgers/U of M	
A99-2679	3418	800	900	357	NH	NA	640	836	397	NH	Rutgers/U of M	
A97-1510	3316	500	700	NH	NH	NA	421	845	582	NH	Rutgers/U of M	
1646S	1646	300	500	NH	NH	107	629	716	484	326	U of Minn	
Unique	3411	750	950	250	428	108	624	809	388	350	Turf-Seed	
A97-1436	3315	400	700	232	268	115	352	874	584	513	Rutgers/U of M	
A99-3240	3421	350	650	NH	NH	NA	328	979	477	NH	Rutgers/U of M	
1628S exp	1628	250	200	NH	NH	99	618	705	381	301	U of Minn	
2073S exp	2073	300	600	NH	NH	107	444	807	446	464	U of Minn	
Trenton	3047	550	NA	NH	NH	96	241	894	553	243	Check variety	
484S exp	484	350	500	NH	NH	NA	425	714	473	NH	U of Minn	
3075R	3075	350	300	NH	NH	96	533	691	326	381	U of Minn	
A97-1523	3317	300	200	NH	NH	NA	452	707	390	NH	Rutgers/U of M	
490S	490	225	NA	NH	NH	NA	372	658	417	NH	U of Minn	
Opti-Green	3410	125	400	NH	NH	74	469	531	372	123	Turf-Seed	
3073R exp	3073	200	300	NH	NH	87	508	566	277	404	U of Minn	
Lato	3408	250	400	NH	NH	75	223	713	397	176	Turf-Seed	
Midnight	3254	450	400	NH	NH	NA	421	529	381	NH	Check variety	
cell5	c5	250	350	NH	NH	80	168	653	426	357	U of Minn	
cell120	c120	200	550	NH	NH	NA	420	455	321	NH	U of Minn	
1621S	1621	175	400	NH	NH	NA	401	506	274	NH	U of Minn	
cell111	c111	150	300	NH	NH	NA	282	531	294	NH	U of Minn	
A97-1433	3314	400	300	NH	NH	NA	226	459	236	NH	Rutgers/U of M	
Northstar	3409	175	NA	NH	NH	50	270	502	129	107	Turf-Seed	
LSD @5%		205	220	144	165	12	106	123	128	72		

*Residue management; Desiccate=2 reps of trial were desiccated 8/7/06 and burned 8/15/06

Burn =2 reps were burned with existing straw only 7/20/06

Years prior to 2006 were burned with straw only in early August.

**NH,NA=Insufficient information to report yield data.

Observations:

This bluegrass variety trial with 4 replications was seeded in 2001 on the Magnusson Research farm.

After harvest in 2006, 2 replications were burned with straw only on July 20.

On August 7, the remaining 2 replications were desiccated with Gramoxone Extra and burned on August 15. Both dates burned well. Visual estimates of seed yield were taken on all plots.

Actual seed yields were taken only on selected plots. Mean visual yields of the desiccate/burn plots were only 73% of the early burn plots. A closer look reveals larger differences.

Early, common varieties (ie. Minnfine and Park) showed little difference whether burned early or late.

Generally later, elite varieties on the other hand, showed significant yield reduction when desiccated and burned at the later date.

The reason for this could have to do the dry conditions present in the fall of 2006 and early 2007.

These varieties may rely more heavily on adequate moisture for fall seed head initiation.

The other thing of note in this trial are the seed yield relative to the visual estimates.

Upon visual observation, the plots in this trial generally appeared to have good seed yield potential.

Visual seed yield estimates typically are relatively close to actual harvested seed yields.

Many of these later varieties, however, appeared visually to have good yields

but actual harvested seed was often times much less.

This seemed to be the case with area production fields in the area as well that looked

fair to good but actual yields were very disappointing. Possible reasons for this could have been the

hot, dry, windy conditions during pollination and seed fill. Early varieties that produced better seed yields

may have missed the worst of these conditions.

Table 3.
2003 Kentucky Bluegrass Variety Trial
Magnusson Research Farm- F7

Variety	Seed lot#	Seed yield				Powdery Mildew** 26-May	Harvest			%Heading			
		2006-7* % mean	2006-7 #/ac	2007 #/ac	2006 #/ac		date	lodging	height	24-May	29-May	5-Jun	11-Jun
SR 2284	3571	149	754	584	923	3	8-Jul	1	27	0	4	40	83
Dragon	3607	146	739	640	838	4.5	7-Jul	1	26	0	10	53	95
Brooklawn	3569	133	670	484	856	2.5	3-Jul	2.3	28	2	10	45	90
Awesome	3576	121	609	475	743	6	10-Jul	1	23	0	0	4	33
Kelly	3579	119	602	381	823	2.8	10-Jul	1	26	0	0	8	43
Merit	3580	117	593	372	814	3.5	10-Jul	1	25	0	0	19	58
3.0009	3574	115	582	384	781	4.8	5-Jul	5.8	27	10	35	83	98
Abbey	3608	114	578	379	776	2	10-Jul	1	25	0	1	16	55
A99-2674	3475	114	575	359	792	1	10-Jul	1	24	0	0	2	35
Midnight Star	3552	112	566	323	809	3.3	10-Jul	1	27	0	1	23	65
Perfection	3577	111	563	379	747	6.5	10-Jul	1	24	0	0	3	38
Pick 2	3582	111	560	404	716	0	10-Jul	1	26	0	3	38	88
A97-1289	3470	110	558	379	736	1	10-Jul	1	25	0	2	33	70
484S	3355	106	535	355	716	2.8	10-Jul	1	23	0	1	18	58
A99-2679	3564	106	534	328	740	0.8	10-Jul	1	23	0	0	3	28
Apollo	3586	105	532	392	671	1	10-Jul	1	29	0	2	16	53
A99-2670	3474	105	530	363	696	0.5	10-Jul	1	23	0	0	8	38
Boutique	3570	104	527	328	727	1.3	10-Jul	1	26	0	4	38	85
Miracle	3550	104	526	415	638	1.3	10-Jul	1	25	4	20	40	73
Atlantis	3581	104	525	392	658	5	10-Jul	1	23	0	0	20	48
Clearwater	3578	102	513	406	620	4	10-Jul	1	26	0	0	10	40
Raven	3584	102	513	326	700	3.8	10-Jul	1	27	0	0	10	43
A99-2893	3565	99	498	277	720	0	10-Jul	1	22	0	0	1	28
Famous	3585	94	475	368	582	6	3-Jul	7	27	10	48	93	100
A99-2628	3563	93	472	355	589	0.8	10-Jul	1	24	0	0	11	45
A99-2626	3590	93	469	357	582	0	10-Jul	1	23	0	0	3	33
Pick 4	3583	92	466	297	636	2	8-Jul	2.8	29	0	5	35	88
Midnight	3539	90	453	314	591	5	10-Jul	1	24	0	0	6	40
A99-2950	3476	88	444	277	611	3.8	10-Jul	1	25	0	0	18	50
3073R	3356	86	433	323	542	2.5	10-Jul	1	26	0	1	20	55
Rambo	3588	85	428	272	584	4	10-Jul	1	29	0	2	33	70
Voyager	3551	84	424	346	502	1.8	5-Jul	5.8	30	2	13	60	95
A99-2235	3472	79	399	245	553	0	10-Jul	1	21	0	0	18	53
Park	3540	76	386	366	406	7.8	26-Jun	6.3	26	14	43	90	100
3.001	3575	75	379	140	618	1	8-Jul	1.3	26	0	2	20	55
3.0008	3573	72	365	161	569	1.8	10-Jul	1.8	27	1	5	25	55
3.0007	3572	69	350	138	562	1	7-Jul	2.3	27	0	9	30	58
Alene	3589	56	284	277	292	4.5	26-Jun	5.8	30	8	33	88	100
Washington	3587	54	275	232	319	2	3-Jul	7.8	28	9	39	90	100
LSD @5% level		17	88	80	149	1.7	2	1.2	2	2	7	2	14

* Yields given are as % of the mean of 505#/ac.

** Powdery Mildew- visual rating ;0=none;9=severe

Management:

This trial was seeded in the fall of 2003. Selected plots were harvested in 2005. All plots were harvested in 2006-7 with yield and other data for the trial above.

Plots were burned in early August, weed sprayed in Sept. and 120+40+50+15s applied in October.

2 oz. of Tilt was applied on 5/27/07.

Table 4.
2005 Kentucky Bluegrass Variety Trial
Field 7SE Magnusson Research Farm

Variety	Seed lot #	2007 Seed yield*		Powdery mildew**		Harvest		% Heading					
		% of mean	(#/ac.)	5/19/2007	5/31/2007	Height(in.)	Lodging	Date	19-May	24-May	31-May	5-Jun	11-Jun
Abbey	3608	159	649	0	1	27	1	3-Jul	0	0	15	33	83
A99-3124	3700	136	555	0	0	26	1	9-Jul	0	0	4	19	50
A99-2674	3475	131	533	0	0.8	26	1	9-Jul	0	0	4	16	48
Miracle	3550	125	511	0	0	26	5	9-Jul	2	9	53	65	98
A99-2893	3636	125	508	0	0.8	25	1	9-Jul	0	0	1	18	48
A99-2670	3697	119	484	0	0	26	1	9-Jul	0	0	3	15	45
A99-2628	3634	117	479	0	0	27	1	9-Jul	0	0	3	15	45
Dragon	3671	116	473	2.3	3.5	27	1	3-Jul	2	5	55	73	100
A99-2679	3737	112	455	0	0	26	1	9-Jul	0	0	4	14	48
Minnfine	3672	107	437	0	1.3	31	6.3	27-Jun	16	45	73	100	100
Brilliant	3670	103	419	0	0	27	1	9-Jul	0	0	3	20	50
A97-1289	3470	103	419	0	0.8	26	1	9-Jul	0	0	23	38	75
Voyager II	3674	98	401	0	1	26	1.3	9-Jul	0	0	6	18	45
A99-2626	3633	98	399	0	0	25	1.3	9-Jul	0	0	1	14	43
Park	3540	97	395	3.3	5.5	29	6.3	27-Jun	5	14	65	100	100
Nuglade	3728	90	368	2.8	4.3	26	1	9-Jul	0	0	4	9	40
Midnight	3539	88	357	4.5	5.8	25	1.3	8-Jul	0	0	2	10	43
Midnight Star	3552	83	339	0.5	2	27	1.5	3-Jul	0	0	14	35	85
Nublu	3727	81	330	0	1.5	28	1	3-Jul	0	0	14	40	83
A97-1436	3629	70	285	0	2	24	1.3	9-Jul	0	0	11	28	60
A99-2235	3696	68	279	0	0	25	1.5	9-Jul	0	0	19		63
A99-2950	3699	64	259	0	2.5	27	1	8-Jul	0	0	6	30	73
Sonic	3673	61	250	0	4.5	29	6.5	1-Jul	0	8	58	88	95
Avalanche	3647	50	203	0.5	0.8	27	6.8	5-Jul	0	2	45	75	100
LSD @5% Level		16	65	0.7	1.6	2	0.6	2	1	4	7	10	10

* Mean yield for the trial=408#/ac.

** Powdery mildew- visual ratings of incidence and severity; 0=none observed , 9=severe
 2 oz. Tilt applied 5/27/07

Table 5. 2002 Kentucky Bluegrass Variety Trial
Magnusson Research Farm - Field F1: Roseau, MN

Variety	Seed lot #	Seed yield (#/ac.)					Mean #/ac.	Seed source
		Estimated 2007#/ac*	2004-6 % of mean	2004 #/ac.	2005 #/ac.	2006 #/ac.		
Abbey	2606	225	169	892	656	586	711	Check variety
484s	3355	225	129	680	464	484	543	U of Minn
Bluestar	3362	275	129	776	453	395	541	PST-Turf-Seed
Park	3324	325	128	716	524	379	540	Check variety
A99-2674	3475	325	128	687	486	439	537	Rutgers/U of M
484S	335	275	127	678	459	467	535	U of Minn
A99-3124	3477	350	122	564	553	426	514	Rutgers/U of M
A97-1289	3470	200	121	558	573	397	509	Rutgers/U of M
A99-2670	3474	350	121	491	560	468	506	Rutgers/U of M
A97-1436	3469	225	118	640	508	337	495	Rutgers/U of M
Midnight	3254	300	116	475	419	573	489	check variety
Park	2000	300	116	694	455	315	488	Check variety
3075r	3075	250	115	809	306	337	484	U of Minn
A99-2628	3473	325	113	671	401	357	476	U of Minn
A97-2306	3447	200	112	658	408	346	471	Rutgers/U of M
Brilliant	3358	400	111	482	475	439	465	PST-Turf-Seed
Unique	3411	325	110	464	486	442	464	Turf-Seed
A99-2950	3476	200	110	455	455	473	461	Rutgers/U of M
A97-1510	3445	200	105	553	459	308	440	Rutgers/U of M
A97-1523	3446	113	103	618	343	332	431	Rutgers/U of M
Trenton	3047	275	95	319	522	357	399	Check variety
A99-2235	3472	300	84	406	308	343	352	Rutgers/U of M
Lato	3408	125	79	372	435	192	333	Turf-Seed
A97-1433	3444	175	72	401	223	288	304	Rutgers/U of M
Moonlight	3359	58	72	385	274	245	301	PST-Turf-Seed
Washington	3239	250	69	214	430	227	290	Norfarm
Opti-Green	3410	138	63	225	388	187	267	Turf-Seed
Blackstone	3357	88	55	181	361	156	233	U of Minn
Northstar	3360	113	48	350	152	103	202	PST-Turf-Seed
Serene	3361	33	26	67	196	69	111	PST-Turf-Seed
LSD @5%		75	14	100	102	78	62	

*Visual seed yield estimate- no actual seed yields taken in 2007.
Data is presented to give an indication of seed yield.

Table 6 .
2005 Tall Fescue Variety Trial
F5 Magnusson Research farm- Roseau,Mn

Variety	Seed Lot#	Seed Yield (#/AC.)			Height(in.) at harvest	% Heading		
		2006-7* 2 Yr.Ave	2006	7/11/2007		7/19/2007	6/12/2007	6/17/2007
Bingo	3714	652	767	306	537	37	16	48
Corgi	3715	782	912	350	651	34	11	40
Rebel Exeda	3716	870	894	466	845	36	16	45
SR 8250	3717	769	830	450	709	37	14	45
Wolfpack	3718	685	783	361	587	37	15	50
LSD @ 5% level		135	92	134	284	1	NS	NS

Management:

Seeded 5/26/05 under spring wheat @ 6#/ac.
 Sprayed 9/10/06 with 2 pt.Curtail + 3/4 pt.Clarity
 Fertilized 10/16/06 - 100+40+60+12 sulfur
 Experimental Design: RCB with 4 reps

Observations:

2 dates of harvest were conducted in 2007.
 The early date(7/11) had green seed present in heads.
 The late (7/19) date had mostly brown seed with some minor shattering(<5%). This date seemed close to the optimum time but 1-2 days earlier may have been preferred. Significant yield reductions were noted on the early harvest date. Yields from the later date were used in the 2 year means.

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Table 7.
2006 Perennial ryegrass Winter Hardiness Variety Trial
Keller block- east side St.Paul ,Mn

Variety	Seed Lot#	4/2/2007	4/27/2007	12/21/2006	Comments
		WI*	WI*	Color**	
Survivor	3648	1.3	1.3	5.5	Winter hardiness selection from Polar Green
MHT	3729	2.0	2.0	6.7	AOPP tolerant ryegrass- best improved quality
NK-200	3538	2.5	2.8	5.2	Winter hardy check
WH x TQ sel.	3639	2.5	2.5	5.2	Reselection from Polar Green
Polar Green	3372	2.5	2.5	5.7	NK-200 topcross winter hardy and turf quality
Ragnar	3366	2.8	2.5	5.2	AOPP(Assure II) tolerant ryegrass
Ragnar II	3611	2.8	3.0	5.5	Reselection from Ragnar
Brightstar SLT	3661	3.3	3.5	6.0	check
Spreader III	3791	3.3	2.5	4.7	Spreading growth habit germplasm
TQ x Spread sel.	3637	3.5	2.8	5.5	Winter hardy selection from TQ x Spread
Affinity	3500	3.8	3.5	5.2	check
Ribeye(annual)	3689	9.0	9.0	2.0	Annual-non hardy check
LSD @ 5% level		0.8	0.9	0.9	

Seeding date: 9/7/06

Experimental Design: RCB with 4 replications

* St.Paul winter injury; 1=none, 9= dead

** Winter color; 9=best, 1=worst

Observations:

Seed production and winter hardiness variety trials at Roseau in 2006 did not survive.
 Data in this table is the reciprocal trial seeded in St. Paul in 2006.

Table 8.
Date of harvest on 'Park' ky.bluegrass
Rice farms- Roseau,Mn

Cut/ Harvest Date	Seed Yield (#/ac)			
	Mean All samples	Cut/bag immediately	Cut and later bag *	
			5-Jul	8-Jul
23-Jun	517	544	491	
25-Jun	564	535	593	
27-Jun	566	575	558	
29-Jun	515	522		508
2-Jul	464	450		477
LSD @5% level	74	91	91	NS

*6/23-6/27 cut, left in field and bagged on 7/5; 6/29 and 7/2 cuts were bagged 7/8.

Mean seed yield of cut and immediately bagged samples(all dates) **525#/ac.**
Mean seed yield of cut and later pickup samples (all dates) **525#/ac.**

Plot setup/hypothesis:

Date of swathing kentucky bluegrass for seed production is an important aspect of optimizing yield and profit. Cutting too early results in excessive immature, light seed. Cutting too late will result in shattering loss.

A third year seed production field of 'Park' kentucky bluegrass just east of the Magnusson Research farm, was selected for this study.

Samples were hand cut approximately every 2 days beginning June 23 and ending July 2. 2 measured area samples were cut and bagged on each date and 2 more samples were cut on each date and left in the field and bagged at a later date to simulate swathing/combining as a producer would do as a typical field operation.

Condition of swath picked up 7/5: 6/23 cut- grass dry but regrowth occurring.

6/25 cut- grass mostly dry but damp on bottom with some grow through.

6/27 cut-some green grass in bottom and top dry.

Condition of swath pickup 7/8 - 6/29 and 7/2 harvest were both dry.

Observations:

As expected, the highest yields were obtained on the June 25-27 cutting dates.

Yields trended lower before and after those dates and was significantly less on the last cut date(July 2) when a significant amount of seed had shattered.

Also addressed in this study is the question as to whether our yield check samples should be cut and left in the field to dry as a grower would do before combining or bag samples immediately as is our normal procedure.

As seen in the data table, there were some small yield variations at different harvest dates between samples immediately bagged and those left in the field for various lengths of time to dry. The average yields, however, over all harvest dates for cut and immediately bagged samples versus samples left in the field to dry and later bagged, was exactly the same at 525#/ac.

Table 9.
Burning management of 'Midnight' kentucky bluegrass
Magnusson Research F5 Farm-Roseau, Mn.

	Treatment	Date	Seed Yield (#/ac.)
1	Burn with straw only	7/20/2006	339
2	Burn with straw only	8/16/2006	282
3	Gramoxone Extra applied Burned	8/7/2006 8/16/2007	198
LSD @ 5% level			23

Harvest date 7/11/07

Management: Entire area disk mowed 7/9/06.

Treat Gramoxone Extra applied @ 1 pt./ac.+.25% NIS with PTO tractor sprayer using Turbo T-Jets nozzels at 25 psi and 16 gpa

Experimental Design: RCB with 5 reps

Observations:

Plot areas treated with Gramoxone Extra burned more completely(black).

Other areas burned adequately but some plant residue remained.

Late fall regrowth was less on the 8/16 burn especially the desiccated areas but burn areas were more clumpy and less uniform in regrowth.

Actual yield data coincides with visual observations at harvest with the later burn, particularly the desiccated plots, yielding significantly less seed.

This would seem to support information from the 2001 variety trial that generally the later elite varieties yielded less seed when desiccated and burned later this year.

The dry fall may have caused this as generally a later burn is not considered detrimental and a complete, hot burn is most important.

Table 10.

**Fungicides applied to 'Midnight' kentucky bluegrass for powdery mildew control
Magnusson Research Farm F5 -Roseau.Mn**

Treatments:	Rate	Application Date:	Plant ht. inches at harvest	Powdery Mildew* at harvest	Seed yield (#/ac)
1 Tilt	2 oz.	5/18/2007	24	4	259
2 Tilt	4 oz.	5/18/2007	25	3.3	245
3 Headline	4 oz.	5/18/2007	26	5.7	260
4 Headline	8 oz.	5/18/2007	24	5.3	238
5 Tilt	2 oz.	5/31/2007	25	2.8	309
6 Tilt	4 oz.	5/31/2007	27	2.3	324
7 Headline	4 oz.	5/31/2007	24	6.3	274
8 Headline	8 oz.	5/31/2007	25	6	279
9 No Treatment			25	6	279
LSD @ 5% level			2	1.5	66

* Powdery Mildew-visual rating; 0= none;9=severe

Harvest date:7/11/07

Conditions: 5/18/ Mildew infection- moderate

5:00pm 75F wind 0-3 mph-NW

Growth stage- elongation/early boot

Conditions: 5/31/ Mildew infection- moderate-severe

12:00 65F wind 3-6ssw

Growth stage- late boot/early heading

Applications made with bicycle sprayer 12.5 GPA @28psi

Management:seeded 8/05

2,4-D+Banvel applied 9/07

120+40+60+12s applied 10/07

burned 8/16/07

Observations:

Surprisingly, there were no significant differences among treatments although highest yield means were obtained with the latest application of Tilt. Visual mildew infection ratings were significantly lower with these treatments,however.

Table 11.
Tolerance of established 'Unique' kentucky bluegrass to preemergent herbicides
for annual bluegrass control 2006-2007

Treatment	Rate	Date	Seed Yield (#/ac.)
No treatment			280
Prowl	3 pts.	10/23/2006	318
Prowl H2O	3 pts.	10/23/2006	298
Nortron	2 pts.	10/23/2006	311
Prowl	3 pts.	5/2/2007	188
Prowl H2O	3 pts.	5/2/2007	244
Nortron	2 pts.	5/2/2007	241

LSD @5% level 107

Treatments 2-4 applied 10/23/06

Treatments 5-7 applied @ 2:00 pm on 5/2/07

Wind E 5-10 mph; 61F

Bluegrass beginning to green up

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Table 12.

Tolerance of fall seeded perennial ryegrass (var.MHT) to pre and post applied herbicides
for annual bluegrass and other weed control
Magnusson Research Farm Roseau,Mn 2006-2007

Treatment	Rate	Timing	Date	Seed Yield (#/ac.)	Broadleaf weed control**
No treatment				995	4.5
Prowl	3 pts.	pre	10/15/2006	NH*	7.5
Prowl H2O	3 pts.	pre	10/15/2006	NH*	7.5
Nortron	2 pts.	pre	10/15/2006	1066	4.5
Prowl	3 pts.	pre	5/6/2007	687	3.0
Prowl H2O	3 pts.	pre	5/6/2007	1115	4.5
Nortron	2 pts.	pre	5/6/2007	477	4.0
Raptor	5 oz.+ .25%NIS+2.5%	post	5/24/2007	NH*	2.0
2,4-D + Clarity	.75pt.+ .75pt.	post	5/24/2007	946	1.0
Raptor	5 oz.+ .25%NIS+2.5% - 28% (2 Qts/A)	post	5/24/2007	NH*	2.5

LSD @5% level NS 1.0

* Severe plant supression or stand reduction with these treatments and ryegrass was not harvested.

** General broadleaf weed control- 1= no weeds; 9=severe weed competition

NH= not harvested because of poor yields

Experimental Design: RCB with 2 reps

Treatments 1-3 applied 10/15/06 with bicycle sprayer at 12 gpa- 28 psi

wind west 0-5 mph 1:00pm 50F

Ryegrass just emerging

Treatments 5-7 applied 5/6/07

Wind W 10 -15; 9:30 am; 52 F

Ryegrass 1-2 inches tall; 4-5 leaf with 3 to 4 tillers

Treatments 8-10 applied 5/24/07

Wind WNW 10-15 mph; 1:00 pm; 66 F

Ryegrass 2 -5 inches tall; 4-6 leaf; 4 to 6 tillers; 2 nodes

Observations Tables 10-11:

Annual bluegrass (poa annua) is a major problem contaminant in seed of kentucky bluegrass as it can not be cleaned out.

Wet, compacted field margins and areas with weak stands of seeded grasses are main areas of concern where annual bluegrass can establish, spread, and cause problems. Using selective preemergent and early post emergent herbicides to reduce or eliminate poa annua seedlings is one possible method of control.

The experiments in tables 11 and 12 had insufficient amounts of poa annua to rate control.

Crop yields were taken to determine adverse treatment effects.

Prowl (pendamethalin) is one possible option for preemergent annual bluegrass control.

Timing of applications is most important and needs to be done as early possible for best weed control.

Applying too early can potentially cause severe crop injury, however. In the fall applications in table 12, the ryegrass was just emerging at the time of application and stands were almost entirely killed.

Because of this lack of competition, weed control was actually less than the untreated check.

Spring applications were tolerated better and yields not significantly different than the checks.

Nortron (ethofumesate) has been a standard herbicide treatment for annual bluegrass control for many years.

Its effects can be sporadic, however, and must be applied preemergent or early post emergent to be effective.

Perennial ryegrass seems to be quite tolerant to Nortron at all growth stages. Established bluegrass seems to tolerate Nortron as well but seedling kentucky bluegrass has potential for injury.

Raptor treatments to ryegrass in Table 11 showed severe crop injury probably should not be used.

Table 13.
2007 Callisto applied to 'Ragnar II' perennial ryegrass for weed control
Magnusson Farms-north of Pioneer farm- 3 mi. northwest of Roseau,Mn.

Timing	Treatment	phytotoxicity	Plant Ht.	Seed yield
		(bleaching*)	inches	(#/ac)
		31-May	at harvest	
None	1)No Treatment	1.0	23.8	1331
Pre	2)Callisto 4SC-- 6 oz./ac	1.8	26.0	1452
Pre	3)Callisto 4SC-- 12 oz./ac	3.0	21.8	1169
Pre+post	4)Callisto 4SC--6 oz+3 oz.+1%COC	2.3	24.0	1545
Post	5)Callisto 4SC-- 3 oz./ac + 1%COC	1.3	24.8	1467
Post	6)Callisto 4SC-- 6 oz./ac + 1%COC	1.0	23.3	1414
Post	7)Callisto 4SC-- 3 oz./ac + 1.33pt Dual Magnum	2.0	21.8	1115
Post	8)(local standard)Banvel 3/4pt.+ 3/4pt. 2,4-D Amine	1.5	24.3	1367
LSD @5% level		0.7	2.6	359

Harvest date= 7/19/07

Bleaching*- (Rated injury)1=none,9=severe chlorosis, none observed 14dat

Treatments applied with bicycle sprayer - 12.5 gpa @ 28psi- 8002XR flat fan nozzels

General Plot Management:

Seeding: Into winter wheat stubble after harvest 8/24/06

Fertilizer: 100+20+30 applied 10/25/07

Fungicide: 10oz. Quilt applied 6/20/07

Growth regulator: 8 oz. Apogee+3 oz. Headline applied 6/2/07

Treatment applications:Preemergent 5/7/07 1:00pm overcast wind WNW 5-10 58F

Ryegrass growth stage- 1-2" tall wheat stubble 8-9"

Post emergent- 5/24/07 5:00pm-overcast, wind WNW 10-15- 66F dry soil conditions

Ryegrass growth stage- 1-2 nodes and plants 1-3 tillers

Herbicide Formulations:

2,4-D amine=3.8# 2,4-D amine salt/gal.

Callisto 4SC=4# mesatrine/gal.

Dual II Magnum=7.64# metolacior/gal.

Banvel=4# dicamba/gal.

Adjuvunct-Destiny MSO

Table 14.

Control of aryloxyphenoxypropionate(AOPP) resistant grass/wild oats in
var. 'MHT' perennial ryegrass underseeded to spring wheat- Establishment year
Magnusson Research Farm Roseau,Mn. 2007

Treatment	Injury*		Common name
	10/13/2007	% stand 10/13/2007	
Assert 1.2 pts. + .25% NIS	1.3	100	imaxamethabenz .375#
Achieve 8 oz. + .25% Supercharge+2.5% 28%N	1.7	100	traikoxydim .2#
Puma .6 pt.	1.3	100	fenoxypop .075#
Rimfire 2 oz. + 1.4 pts. MSO	7.7	7	propoxycarbazone+mesosulfuron
no treatment	1.0	100	
LSD @5% level	1.0	2	

* 1=no visual injury;9=dead

Applications made:

6/23/07 1:00pm

wind West 4-8 80F

field very wet- Per. Ryegrass about 2 leaf stage

Observations:

Control of wild oats and other grasses in non-AOPP tolerant perennial ryegrass is important aspect of weed control in ryegrass seed under spring wheat.

Puma(fenoxypop) has been a standard treatment for control of many grassy weed species including wild oats. Resistance has developed in some weed populations,however, and it will be necessary or at least desirable to rotate different products other than the AOPP chemistry, which Puma is one, to maintain grassy weed control in ryegrass production fields. During the establishment year under wheat in table 14 both Assert and Achieve were tolerated well and had minimal vigor or stand reduction problems.

These products have been tested in previous years as well and the ryegrass tolerance has generally been good.

The product Rimfire produced severe injury to ryegrass during both establishment and production and should not be used if ryegrass is to be produced.

However, if one wants to control or kill ryegrass seedlings in wheat, there may be an application for the use of Rimfire.

Table 15.

Fall fungicide applications and fertility timing on perennial ryegrass (var.Ragnar II) under seeded in spring wheat in 2006- F2B Magnusson Research Farm

Treatments:	Seed Yield (#/ac.)
1)no treatment+ early fert.	1153
2)no treatment + late fert.	1021
3)Headline + early fert.	1086
4)Headline + late fert.	1182
5)Quilt + early fert.	1153
6)Quilt + late fert.	1070

LSD @5% level NS

Mean of: Quilt=1112#/ac.

Fall fertilizer =1091#/ac.

Headline=1134#/ac.

Split fertilizer application=1131#/ac

No treatment=1087#/ac.

Early fertilizer =33-33-50-15s applied 9/1/06 & 67-0-0 applied 5/14/07

Late fertilizer= all fert applied 10/15/06 100-33-50-15s

Fungicides applied-8/27/06-11am

ryegrass= 2"- 5" Rust - Moderate infestation level

wheat stubble 10"

Headline rate = 12 oz/A

Quilt rate = 16 oz/A

General Management:

1 pint Palisade applied 5/28/07

10 oz. Quilt applied 6/14/07

.75pt Banvel+.75pt 2,4-D and 10 oz. Assure II applied 6/2/07

Observations:

It is thought that better winter hardiness may be realized with fall applications of fungicides and also splitting fertilizer applications between fall and spring. In theory, healthier plants going into winter could increase winter survival and also increase seed yield.

In this trial, fall incidence of stem and crown rust were decreased with fungicide applications and particularly early fall fertilizer applications. Seed yields in 2007, however, showed marginal yield increases from both of the fungicide treatments and the split(early) fertilizer application but none of the treatments were significantly different.

Table 16.

**Perennial Ryegrass (var.MHT) fungicide application trial + late growth regulator application
Magnusson Research Farm-Roseau, Mn.- 2007**

Treatment	Rate	timing	Seed Yield (#/ac)			Lodging at harvest		Fungicide
			Mean	No GR	GR added	No GR	GR added	Cost/ Benefit
Headline	6 oz.	Optimum(June 20)	1248	1284	1211	6.8	3.8	\$55.75
Quilt	10 oz.	Optimum(June 20)	1194	1155	1233	7.3	2.8	\$30.50
Headline	4 oz.+4 oz.	early + late (6/10+6/29)	1335	1305	1365	7.0	3.3	\$91.75
Tilt+Quilt	3 oz.+8oz.	early + late (6/10+6/29)	1272	1195	1349	7.3	2.8	\$60.00
Headline	8 oz.	late(6/28)	1236	1224	1247	7.5	2.8	\$46.35
Quilt	14 oz.	late(6/28)	1190	1182	1198	6.8	3.0	\$25.10
Folicur	4 oz.	late (6/29)	1132	1169	1095	6.8	3.0	\$1.00
No treatment			1108	1068	1148	6.5	3.0	\$0.00
LSD @5% level			106	180	139	1.1	1.0	

First timing applied @ 2 pm on 6/10/07
Clear, 75 F
Wind, 5mph from SSW
Ryegrass 10-16 inches tall
Main stem 50% head emergence
Tillers 0 to 20% head emergence

Apogee @ 16oz/A + NIS 0.25% + 28% 2.5%
Applied on 6/21/07
1:30 pm clear 73 F Wind ESE @ 5 to 10 MPH
Ryegrass Fully headed on main stem
14 to 20 inches tall

Second timing applied 6/20/07
10:30 am, 67 F
Clear; wind W 5 MPH
Ryegrass fully headed
14 to 20 inches tall

Third timing applied 6/28/07
9:00am; wind WNW 5 Partly cloudy; 62 F
Ryegrass fully headed
18 to 24 inches tall
Folicur applied 6/29/07
11:30 am ;wind ESE 5-10 Clear; 69 F
Ryegrass fully headed
18 to 24 inches tall

Trade name	common name	Price/gal.
Headline	pyroclostrobin	\$215
Quilt	Azoxystrobin+propiconazole	\$109
Tilt	propiconazole	\$265
Folicur/generic	tebuconazole	\$200

Treatment applications:

Fungicide treatments were applied to 'MHT' on the Magnusson research farm in this trial in 2007. Fungicide treatments were made on dates that would be considered optimum(early rust symptom observed), late(moderate rust symptoms), and split (2 treatment applications: one before optimum and one 2-3 weeks later). Growth regulator was applied late to a portion of each plot.

Results:

The growth regulator alone produced no significant seed yield increase. The mean of all treatments without the growth regulator was 1198#/ac. vs. 1231#/ac where growth regulator was applied. The late application date likely caused no additional head initiation to occur. Lodging was significantly reduced, however, and effects of the application were visibly apparent.

For the means of the 7 fungicide treatments, 4 were significantly higher than the checks.

The cost analysis revealed positive figures for all fungicide treatments.

Even though rust infestation did not appear to be much of a problem, seed yield increases were noted on all fungicide treatments.

Table 17.
2007 Growth Regulator/Fungicide Trial Perennial Ryegrass- var. Ragnar II
Ardell Magnusson Farms- 5 mi. nw of Roseau

Treat#	Treatment	Common name	Rate/adjuvant	Timing	Seed Yield (#/ac)*	Rust at harvest**	Lodging at harvest	Ht.(in.) at harvest
1	No Treatment				1230	3.3	7.0	31
2	Palisade	trinexapac-ethyl	1 pt.	6/8/2007	1209	3.5	1.8	24
3	Apogee	prohexadione calcium	10 oz.+25%NIS+2pls.28% 'N'	6/8/2007	1231	3.5	1.0	23
4	Palisade	trinexapac-ethyl	1.5 pt.	6/15/2007	937	3.3	3.8	28
5	Apogee	prohexadione calcium	16 oz.+ NIS+28%	6/15/2007	1113	3.3	3.3	26
7	Quilt	azoxystrobin+propiconazole	12 oz.	6/21+7/5	1171	1.5	6.5	29
9	Headline	pyroclostrobin	8 oz.	6/21+7/5	1113	2	6.5	30
12	2 + 6	Pal+ 1x Quilt	1.5 pt.+12 oz.	6/8+6/21	1269	2.5	1.3	24
13	2 + 7	Pal + 2x Quilt	1.5 pt.+12 oz.x2	6/8+both	1182	2	1.0	24
14	3 + 8	Apo + 1x Headlin	16 oz.+8 oz.	6/8+6/21	1253	3	1.0	23
15	3 + 9	Apo + 2xHeadlin	16 oz.+8 oz.x2	6/8+both	1345	2.3	1.0	24
LSD @5% level					198	1.6	1.3	2

*- NH plots not harvested as fungicide was applied to all of these plots

** 1=no visual rust symptom;5=severe rust

Harvest date:7/20/07

First Timing of growth regulators applied 6/8

6:00 PM, 66 F pty cldy wind SSW 5-10

Ryegrass 10-14 inches tall; 30% head emergence on main culm

Majority of tillers late boot to early heading

First fungicide timing applied 6/21

4:30 PM ; 78 F wind ESE 5-10

Ryegrass fully headed on main stem -18-22 inches tall

Tillers headed and shedding pollen

Second Timing of growth regulators applied 6/15

1.5 rate used for both products due to advanced growth stage of ryegrass

11:30 Am, 71 F wind W 10-15 pty cldy

Ryegrass 14 to 18 inches tall

Main stem fully headed

Late fungicide applied 6/27 (trt # 16 & 17).

5:30 pm Clear, wind calm, 60 F

Ryegrass fully headed, lodged

Pant height 20 -26 inches

Late split application applied on 7/5 (trt # 7,9,13 & 15).

6:00 PM; 77 F wind WNW 5-10

Ryegrass just beginning to turn color

20 - 28 inches tall and lodged

Observations:

On July 3 all plots received 12 oz. of Quilt. This may have negated fungicidal effects of some treatments and were therefore not harvested. No significant yield increases were obtained with any treatments. Visual rust readings were somewhat lower(cleaner) on some of the fungicide treatments at harvest, however.

Table 18.
2007 Growth Regulator/Fungicide Trial
Per.Ryegrass- var. Ragnar II-
Magnusson Farms- 4 mi. nw of Roseau

Treat#	Treatment	Common name	Rate/adjuvant	Timing	Seed Yield (#/ac.)	Harvest Ht.(in.)	Lodging		
							6/24/2007	7/12/2007	Harvest
1	No Treatment				1050	27	3.8	7.0	7.5
2	Palisade	trinexapac-ethyl	1 pt.	5/27/2007	901	23	1.3	1.8	2.8
3	Apogee	prohexadione calcium	10 oz.+ .25%NIS+2pts.28% N	5/27/2007	1017	20	1.0	1.0	1.0
4	Palisade	trinexapac-ethyl	1 pt.	6/8/2007	885	22	1.1	1.7	2.3
5	Apogee	prohexadione calcium	10 oz.+ NIS+28%	6/8/2007	954	19	1.0	1.0	1.0
6	Quilt	azoxystrobin+propiconazole	12 oz.	6/21/2007	1075	27	3.8	7.8	7.5
7	Quilt	azoxystrobin+propiconazole	12 oz.	6/21/2007+ 7/5	1024	27	2.5	7.3	7.3
8	Headline	pyroclostrobin	8 oz.	6/21/2007	1041	25	3.5	6.8	6.8
9	Headline	pyroclostrobin	8 oz.	6/21/2007 + 7/5	905	27	4.0	8.0	8.0
10	Quadris	azoxystrobin	8 oz.	6/21/2007	1061	28	4.3	7.5	8.0
11	Tilt	propiconazole	4 oz.	6/21/2007	845	26	2.8	7.5	7.0
12	2 + 6	Pal+ 1x Quilt	1 pt.+12 oz.	5/27/07+6/21	1032	23	1.4	4.3	3.0
13	2 + 7	Pal + 2x Quilt	1 pt.+12 oz.x2	5/27/07+ 6/21 + 7/5	1061	23	1.8	4.3	4.8
14	3 + 8	Apo + 1x Headlin	10 oz.+8 oz.	5/27/07+6/21	1222	22	1.0	1.0	1.5
15	3 + 9	Apo + 2xHeadlin	10 oz.+8 oz.x2	5/27/07+6/21 + 7/5	1079	21	1.0	1.0	1.5
16	Quilt	azoxystrobin+propiconazole	12 oz.	6/27/2007	983	27	3.3	7.5	7.8
17	Headline	pyroclostrobin	8 oz.	6/27/2007	970	27	3.3	7.3	6.5
Harvest date: 7/19/07			LSD @ 5% level		172	2	1.1	1.9	1.3

Growth regulator-

Optimum 2 nodes -5/27/07
 second application=7-10 days later- 6/8/07

5/27/07 8:00pm growth regulator- 1st timing
 69 F; Sunny, calm
 Ryegrass 5 -7 inches tall; 6 to 7 leaf; 1 to 3 tillers
 Ryegrass - 2 to 4 nodes; majority of main stems have 3 nodes

6/8/07 1:00pm growth regulators- 2nd timing
 67F; Partly cloudy Wind SSW 10-15 mph
 Ryegrass 11-17" 30% headed
 tillers boot to early heading

Fungicide:

Optimum=6/21/07
 late application= 1 week later- 6/27/07
 2x application=2-3 weeks later- 7/5/07

6/21 Fungicide 1st timing
 11:30 AM ; 70 Wind 5- 10 MPH ESE
 Ryegrass fully headed on main stem; 16-22 inches tall
 Tillers headed and shedding pollen

6/27 Fungicide late timing
 8:00 pm; Partly cloudy; 60F
 Wind 5-10 MPH WNW
 Ryegrass 18- 24 inches tall
 Full head extension main stem and tillers

7/5 Fungicide split 2nd timing
 9:00:00 PM; 74F
 Clear; Wind WNW 5-10 mph
 Ryegrass just beginning to turn color
 20 - 28 inches tall
 Ryegrass lodged

Table 19.
2007 Growth Regulator/Fungicide Trial
Per.Ryegrass-var. Ragnar II
Amundson Bros. Farms-3 mi south of Roseau

Treat#	Treatment	common name	Rate/adjuvant	Timing	Seed Yield (#/ac.)	Height(in)		Lodging	
						at harvest	7/12/2007	at harvest	at harvest
1	No Treatment				1016	26	4.0	5.5	
2	Palisade	trinexapac-ethyl	1 pt.	5/28/2007	1057	24	1.5	3.0	
3	Apogee	prohexadione calcium	10 oz.+ .25%NIS+2pts.28% 'N'	5/28/2007	1011	23	1.0	1.8	
4	Palisade	trinexapac-ethyl	1 pt.	6/8/2007	1006	24	2.0	3.0	
5	Apogee	prohexadione calcium	10 oz.+ NIS+28%	6/8/2007	961	20	1.0	1.0	
6	Quilt	azoxystrobin+propiconazole	12 oz.	6/19/2007	1065	25	5.5	5.5	
7	Quilt	azoxystrobin+propiconazole	12 oz.	6/19/2007+ 7/5	1122	26	6.5	6.3	
8	Headline	pyroclostrobin	8 oz.	6/19/2007	1041	27	4.5	5.3	
9	Headline	pyroclostrobin	8 oz.	6/19 + 7/5	1102	27	6.5	6.8	
10	Quadris	azoxystrobin	8 oz.	6/19/2007	1113	28	5.0	5.5	
11	Tilt	propiconazole	4 oz.	6/19/2007	1091	26	4.8	4.8	
12	2 + 6	Pal+ 1x Quilt	1 pt.+12 oz.	5/28 + 6/19	1302	24	1.8	3.3	
13	2 + 7	Pal + 2x Quilt	1 pt.+12 oz.x2	5/28/07+6/19+7/5	1178	24	2.3	3.5	
14	3 + 8	Apo + 1x Headlin	10 oz.+8 oz.	5/28/07+6/19	1251	22	1.0	1.3	
15	3 + 9	Apo + 2xHeadlin	10 oz.+8 oz.x2	5/28/07+6/19+ 7/5	1166	23	1.3	2.0	
16	Quilt	azoxystrobin+propiconazole	12 oz	6/27/2007	1106	29	6.3	7.0	
17	Headline	pyroclostrobin	8 oz.	6/27/2007	1151	27	5.8	6.5	
LSD @5% level					220	3	1.4	1.5	

Growth regulator- schedule

optimum 2 nodes- 5/28/07
 Second application=7-10 days later-6/8/07

5/28 Application

8:00 AM ; heavy dew
 Wind calm
 46 F
 Clear sky

Ryegrass 7-9 inches tall; 5 to 6 leaves; 2 to 4 tillers
 Majority of ryegrass has two nodes; some have late boot to early heading

6/19 Application

8:30 PM ; 67F
 Wind 0-5 MPH W

Ryegrass fully headed on main stem; 16-22 inches tall
 Tillers headed and shedding pollen

Fungicide- schedule

optimum= 6/19/07 ryegrass fully headed
 late application= 1 week later 6/27/07
 2x application=Before optimum treatment and 3 weeks later

6/8 Application

3:00 PM
 Wind SSW 5-10
 Partly Cloudy

6/27 Application

6:00 pm; Partly cloudy; 62F
 Wind 5-10 MPH WNW
 Ryegrass 18- 24 inches tall
 Full head extension main stem and tillers

7/5 Application

7:30 PM; 76 F
 Clear; Wind WNW 5-10 mph
 Ryegrass just beginning to turn color
 20 - 28 inches tall
 Ryegrass lodged

Table 20.
2007 Growth Regulator/Fungicide Trials*
Summary of Magnusson/Amundson locations

treat#	Treatment	common name	Rate/adjuvant	Timing	Seed Yield (#/ac.)	Harvest Ht.(in.)	Lodging at Harvest**	Cost *** Analysis
1	No Treatment				1033	27	6.5	0.00
2	Palisade	trinexapac-ethyl	1 pt.	optimum	979	23	2.9	-61.31
3	Apogee	prohexadione calcium	10 oz.+ .25%NIS+2pts.28% 'N'	optimum	1014	22	1.4	-48.28
4	Palisade	trinexapac-ethyl	1 pt.	optimum	946	23	2.6	-78.04
5	Apogee	prohexadione calcium	10 oz. + NIS+28%	optimum	958	20	1.0	-76.16
6	Quilt	azoxystrobin+propiconazole	12 oz.	optimum	1070	26	6.5	4.20
7	Quilt	azoxystrobin+propiconazole	12 oz.	optimum+late	1073	26	6.8	-8.40
8	Headline	pyroclostrobin	8 oz.	optimum	1041	26	6.0	-13.49
9	Headline	pyroclostrobin	8 oz.	optimum+late	1004	27	7.4	-49.30
10	Quadris	azoxystrobin	8 oz.	optimum	1087	28	6.8	7.16
11	Tilt	propiconazole	4 oz.	optimum	968	26	5.9	-45.17
12	2 + 6	Pal+ 1x Quilt	1 pt.+12 oz.	optimum	1168	23	3.1	18.70
13	2 + 7	Pal + 2x Quilt	1 pt.+12 oz.x2	optimum+	1119	24	4.1	-19.47
14	3 + 8	Apo + 1x Headlin	10 oz.+8 oz.	optimum	1237	22	1.4	45.82
15	3 + 9	Apo + 2xHeadlin	10 oz.+8 oz.x2	optimum+	1123	22	1.8	-32.45
16	Quilt	azoxystrobin+propiconazole	12 oz.	late	1045	28	7.4	-8.62
17	Headline	pyroclostrobin	8 oz.	late	1060	27	6.5	-4.02
LSD @ 5% level					142	2	1.1	

*Table 20 is a 2007 data summary of the treatment means for the Amundson location south of Roseau and the Magnusson farms location northwest of Roseau.

**Lodging; 1=no lodging;9=severe lodging

***Cost analysis=treatment seed yield minus the no treatment yield (1033#) X \$.50/# of ryegrass seed. Chemical costs + \$4/ac. application charge per treatment is also subtracted.

Observations:

No benefit, other than a seed yield difference, was considered for any treatment(ie.ease of swathing, faster dry down and less residue for growth regulator plots was not taken into account here).

The only significantly higher seed yield was for treatment #14. Cost analysis showed 11 of the 16 treatments in these 2 locations in 2007 were performed at a revenue loss. Previous years results indicated an advantage for the use of a fungicide often times but these 2 locations showed no clear yield advantage for the use of either a fungicide or a growth regulator but a combination both appeared to show yield benefits.

Chemicals used in these trials and cost:

Trade name	common name	Application Rate	Active Ingredient	AI/ac.	Adjuvants	\$\$\$Cost of chemical only
Palisade EC	trinexapac-ethyl	1 pt.	2.1#/gal.	.2625#	none	\$30.00
Apogee	prohexadione calcium	10 oz.+	27.5 DF%	.172#	.25%NIS+2pts.28% 'N'	\$34.00
Tilt	propiconazole	4 oz.	3.72#/gal.	.1163#	none	\$8.28
Quadris	azoxystrobin	8 oz.	2.08#/gal.	.13#	none	\$15.60
Headline	pyroclostrobin	8 oz.	2.09#/gal.	.131#	none	\$13.40
Quilt	azoxystrobin+propiconazole	12 oz.	1.04#+.62#/gal	.0975#+.058#	none	\$10.20

Table 21.
Weed planting/control experiment:
Magnusson Research Farm-Roseau-F6

Seeded	Herbicide Treatment #																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Park' ky.bluegrass-3324	3.0	3.0	1.0	6.0	1.0	1.5	2.5	1.5	1.0	1.0	1.0	1.0	3.5	1.5	2.5	2.5	5.0	4.0	9.0	2.5	2.5	1.0	6.5	2.5	1.0	5.0
Climax timothy- 3537	4.5	8.0	2.5	8.5	8.0	3.0	1.5	2.5	1.5	1.0	2.0	2.5	2.5	1.0	5.0	4.0	9.0	8.0	6.5	4.0	5.5	1.0	9.0	5.0	1.0	9.0
Palaton reed canarygrass-3433	8.0	6.5	3.5	7.0	3.0	2.0	1.5	2.5	1.5	1.0	1.0	1.0	4.0	2.0	4.5	4.5	8.0	8.0	9.0	9.0	6.5	1.0	9.0	2.0	1.0	9.0
Ragnar per.ryegrass-3366	4.0	3.5	2.5	2.5	1.0	1.0	1.5	2.5	1.5	1.0	2.0	1.5	2.0	1.0	2.0	1.5	2.0	1.5	4.0	8.0	3.0	1.0	9.0	4.5	1.0	9.0
Ryegrass/weed mix-#1	3.0	2.5	1.5	1.5	1.5	1.0	1.0	1.5	1.5	1.0	2.5	2.0	1.5	1.5	3.5	2.0	7.5	1.5	6.5	8.0	3.5	1.5	9.0	6.0	1.5	9.0
Ryegrass/weed mix-#2	3.5	4.0	2.5	2.5	1.5	1.5	1.0	1.5	1.0	1.0	1.0	1.5	1.5	2.0	2.0	2.0	8.0	1.5	7.0	8.0	3.5	1.0	9.0	5.0	1.0	9.0

Stand/ injury rating - 6/24/07: 1 = no injury to 9 = dead

LSD @ 5% level 1.8

Herbicide Treatment #	Timing	Treatment-	Application Rate	formulation	Common name- ai/ac.
1*	9/12/06*	Everest	.61 oz. +.25%NIS	70%WDG	flucarbazone .027#
2*	9/12/06*	Beacon	.4 oz. +.25%NIS	80WG	primisulfuron .02#
3*	9/12/06*	Axial	8.2 oz.+9.6 oz. 12127 adj.	.83#/gal.	pinoxaden .053#
4*	9/12/06*	Assure II	12 oz.+ .25% NIS	.88#/gal.	quizalofop .0825#
5*	9/12/06*	Puma	.5 pt.	1#/gal.	fenoxypop .0625#
6	9/12/2006	2,4-D amine + Clarity	(3/4 pt.+3/4pt.)	3.8#+4#/gal.	2,4-Damine .35#+dicamba .375#
7	9/12/2006	Express XP + 2,4-D	.3 oz + 1 pt. +4pt. 28%	75%DF	tribenuron .014#+2,4-D .475# amine .35#
8	9/12/2006	Callisto	6 oz.+ 1% COC	4#/gal.	mesatrine .188#
9	9/12/2006	Curtail	2 pt.	2#+.38#	2,4-Damine .375#+clopypalid .095#
10		No Treatment			
11	10/15/2006	Prowl	3.5 pts.	3.3#/gal.	pendimethalin 1.4#
12	10/15/2006	Prowl H2O	3 pts.	3.8#/gal.	pendimethalin 1.4#
13	10/15/2006	NortronSC	2 pts.	4#/gal.	ethofumesate 1#
14*	5/7/07*	Prowl	3.5 pts.	3.3#/gal.	pendimethalin 1.4#
15*	5/7/07*	Prowl H2O	3 pts.	3.8#/gal.	pendimethalin 1.4#
16*	5/7/07*	NortronSC	2 pts.	4#/gal.	ethofumesate 1#
17*	5/24/07*	Assure II	12 oz.+ .25% NIS	.88#/gal.	quizalofop .0825#
18*	5/24/07*	Puma	.5 pt.	1#/gal.	fenoxypop .0625#
19	5/24/2007	Aatrex 4L	2 pts.+1%COC	4#/gal.	atrazine 1#
20	5/24/2007	Everest	.61 oz. +.25%NIS	70%WDG	flucarbazone .027#
21	5/24/2007	Beacon	.4 oz. +.25%NIS	80WG	primisulfuron .02#
22	5/24/2007	Callisto	3 oz.+ 1% COC	4#/gal.	mesatrine .094#
23	5/24/2007	Axial + Bronate advance	8.2 oz.+1 pt.+ 9.6 oz. 12127 adj.	.83#+2.5#+2.5#/gal	pinoxaden .053#+
24	5/24/2007	Express XP + 2,4-D	.3 oz + 1 pt. +4pt. 28% N	75%DF	tribenuron .014#+2,4-D .475# amine .35#
25	5/24/2007	2,4-D+Clarity	.75pt+.75pt.	3.8#+4#/gal.	2,4-Damine .35#+dicamba .375#
26	5/24/2007	Raptor	5 oz.+25% NIS+4 pts. 28%N	1#/gal.	imazamox .039#

*= 3/4 pt. 2,4-D+3/4 pt. Clarity applied 9/18/07

fall 9/18/06 5:00 PM soil conditions dry
 9/12/06 7:00 PM NE 0-5 Soil conditions dry-
 5/24/2007- 10 am, 68 F, wind WNW 5-10, gusts to 15 mph
 Ryegrass- 6-9" 2-3 nodes
 Timothy - 10-13 "
 Reed - 13-16"
 Bluegrass - heading

Plot setup/observations:

Till, fertilize and plant spring wheat

Strip plant weed seed mix1 and 2.(Norfarm/Northern excellence)- 2 reps

strip plant ryegrass,bluegrass,timothy, reed canarygrass

On May 18 2006 spring wheat was planted on the Magnusson Research farm. Under seeded into this wheat were 4 - 10' wide strips x 2 replications of grass monocultures and 2 strips of ryegrass with difficult to clean out weeds from Norfarm Seeds and Northern Excellence. Wheat was managed as a production field and was harvested in August.

Under seeded crops had adequate to good stands but weedy mixes failed to establish.

Conditions for the fall post emergent herbicide applications were very dry and crops were not actively growing.

Less than ideal conditions for screening crop tolerance. Treatment# 1-9 were applied on Sept.12 with injury ratings

more or less than expected in some cases because of these dry conditions. Spring and fall dormant treatment# 11-15 and

spring treatments 17-26 were applied during more favorable conditions. * treatments had a standard broadleaf weed treatment

of 3/4pt.Clarity+ 3/4pt. 2,4-D applied on 9/18/06.

Visual injury rating for all treatments were taken on June 26,2007. Figures in bold may be of most interest.

Table B1. 2006 and 2007 Nitrogen Fertilizer Trial Applied to 'Park' Kentucky Bluegrass - Magnusson Farms

Nitrogen Formulation	2006					2007					
	Application Rate	Application Timing	Harvest Ht.(in.)	Lodging*	Seed Yield lbs/A	Application Rate	Application Timing	Harvest Ht.(in.)	Lodging*	Seed Yield lbs/A	
No Treatment	0	—	27	1	122	0	—	21	1	17	
Urea	60	10/25/2006	32	3	261	60	10/23/2007	25	3	26	
Urea	60 + 40	10/25 + 5/1	32	7	221	60 + 40	10/23 + 5/1	25	9	32	
Urea	100	10/25/2006	32	4	307	100	10/23/2007	27	6	49	
Urea	120	10/25/2006	32	6	269	120	10/23/2007	26	6	51	
Urea	100 + 40	10/25 + 5/1	31	6	260	100 + 40	10/23 + 5/1	25	9	54	
Urea	140	10/25/2006	29	5	330	140	10/23/2007	26	8	30	
Ammonium Sulfate	60	10/25/2006	31	1	196	60	10/23/2007	25	2	33	
Ammonium Sulfate	60 + 40	10/25 + 5/1	32	8	324	60 + 40	10/23 + 5/1	24	9	33	
Ammonium Sulfate	100	10/25/2006	33	6	336	100	10/23/2007	25	7	44	
Ammonium Sulfate	120	10/25/2006	31	7	341	120	10/23/2007	26	8	82	
Ammonium Sulfate	100 + 40	10/25 + 5/1	30	8	311	100 + 40	10/23 + 5/1	25	9	37	
Ammonium Sulfate	140	10/25/2006	31	8	315	140	10/23/2007	27	8	50	
Ammonium Nitrate	60	10/25/2006	32	1	288	60	10/23/2007	26	4	56	
Ammonium Nitrate	60 + 40	10/25 + 5/1	31	7	294	60 + 40	10/23 + 5/1	26	9	42	
Ammonium Nitrate	100	10/25/2006	32	4	374	100	10/23/2007	26	8	81	
Ammonium Nitrate	120	10/25/2006	32	4	294	120	10/23/2007	27	8	71	
Ammonium Nitrate	100 + 40	10/25 + 5/1	32	7	358	100 + 40	10/23 + 5/1	25	8	38	
Ammonium Nitrate	140	10/25/2006	31	4	301	140	10/23/2007	26	8	78	
Coated Urea	60	10/25/2006	30	5	138	60	10/23/2007	22	3	28	
Coated Urea	60 + 40	10/25 + 5/1	31	7	201	60 + 40	10/23 + 5/1	22	2	18	
Coated Urea	100	10/25/2006	30	6	185	100	10/23/2007	23	4	28	
Coated Urea	120	10/25/2006	32	6	220	120	10/23/2007	22	4	25	
Coated Urea	100 + 40	10/25 + 5/1	31	5	201	100 + 40	10/23 + 5/1	22	5	25	
Coated Urea	140	10/25/2006	30	6	163	140	10/23/2007	24	5	33	
LSD @ 5% level					44	LSD @ 5% level					13

General Management:

3 oz. Tilt applied on 5/17/06

Harvest date- 6/27/06

5/28/2007 3 oz. Tilt

Harvest date- 7/3/07

Table B2. 2006 and 2007 Nitrogen Fertilizer Trial Applied to 'Park' Kentucky Bluegrass - Helmstetter Farm

Nitrogen Formulation	2006					2007					
	Application Rate	Application Timing	Harvest		Seed Yield	Application Rate	Application Timing	Harvest		Seed Yield	
			Ht.(in.)	Lodging*	lbs/A			Ht.(in.)	Lodging*	lbs/A	
Control	0	--	30.0	1.5	386	0	--	22	1	49	
Urea	60	10/25/2006	31.3	2.3	655	60	10/23/2007	29	1	145	
Urea	60 + 40	10/25 + 5/1	32.3	3.0	775	60 + 40	10/23 + 5/1	27	7	183	
Urea	100	10/25/2006	32.3	3.0	794	100	10/23/2007	28	4	167	
Urea	120	10/25/2006	32.8	5.8	704	120	10/23/2007	29	3	203	
Urea	100 + 40	10/25 + 5/1	32.0	6.0	767	100 + 40	10/23 + 5/1	28	8	237	
Urea	140	10/25/2006	31.8	5.8	651	140	10/23/2007	29	6	176	
Ammonium Sulfate	60	10/25/2006	32.5	3.5	788	60	10/23/2007	29	2	121	
Ammonium Sulfate	60 + 40	10/25 + 5/1	32.0	5.3	665	60 + 40	10/23 + 5/1	29	7	222	
Ammonium Sulfate	100	10/25/2006	32.3	6.0	697	100	10/23/2007	29	4	154	
Ammonium Sulfate	120	10/25/2006	32.3	5.0	728	120	10/23/2007	28	6	173	
Ammonium Sulfate	100 + 40	10/25 + 5/1	32.8	5.8	716	100 + 40	10/23 + 5/1	28	9	254	
Ammonium Sulfate	140	10/25/2006	31.8	5.5	823	140	10/23/2007	29	7	258	
Ammonium Nitrate	60	10/25/2006	32.3	2.8	705	60	10/23/2007	28	3	134	
Ammonium Nitrate	60 + 40	10/25 + 5/1	24.8	5.8	750	60 + 40	10/23 + 5/1	29	8	257	
Ammonium Nitrate	100	10/25/2006	33.3	3.8	699	100	10/23/2007	28	6	230	
Ammonium Nitrate	120	10/25/2006	32.5	3.5	564	120	10/23/2007	29	6	273	
Ammonium Nitrate	100 + 40	10/25 + 5/1	32.5	5.0	631	100 + 40	10/23 + 5/1	28	8	239	
Ammonium Nitrate	140	10/25/2006	32.0	5.5	718	140	10/23/2007	28	7	212	
Coated Urea	60	10/25/2006	31.8	4.8	610	60	10/23/2007	24	2	107	
Coated Urea	60 + 40	10/25 + 5/1	31.8	4.3	617	60 + 40	10/23 + 5/1	26	3	148	
Coated Urea	100	10/25/2006	32.0	4.0	700	100	10/23/2007	27	4	135	
Coated Urea	120	10/25/2006	31.5	6.0	638	120	10/23/2007	26	4	134	
Coated Urea	100 + 40	10/25 + 5/1	32.0	7.0	662	100 + 40	10/23 + 5/1	25	5	141	
Coated Urea	140	10/25/2006	33.5	7.3	729	140	10/23/2007	27	6	103	
LSD @ 5% level					71	LSD @ 5% level					23

General Management:

3 oz. Tilt applied on 5/16/06

Harvest date: 6/27/06

6/2/07 4 oz. Tilt

Harvest date- 7/3/07

Table B3. 2006 and 2007 Nitrogen Fertilizer Trial Applied to 'Ragnar' (2006) and 'Ragnar II' (2007) Perennial Ryegrass - Magnusson Farms

Nitrogen Formulation	2006					2007					
	Application Rate	Application Timing	Harvest		Seed Yield	Application Rate	Application Timing	Harvest		Seed Yield	
			Ht.(in.)	Lodging*	lbs/A			Ht.(in.)	Lodging*	lbs/A	
Control	0	--	28.6	4.0	1436	0	--	20	1	512	
Urea	60	10/24/2006	29.5	5.5	1738	60	10/23/2007	21	1	828	
Urea	60 + 40	10/24 + 5/15	30.3	7.0	1819	60 + 40	10/23 + 5/15	28	6	1447	
Urea	100	10/24/2006	31.5	6.5	1684	100	10/23/2007	25	3	1173	
Urea	120	10/24/2006	28.8	5.5	1618	120	10/23/2007	26	4	1328	
Urea	100 + 40	10/24 + 5/15	29.8	6.3	1854	100 + 40	10/23 + 5/15	28	6	1282	
Urea	140	10/24/2006	30.0	6.5	1844	140	10/23/2007	26	6	1301	
Ammonium Sulfate	60	10/24/2006	28.5	4.0	1510	60	10/23/2007	24	1	900	
Ammonium Sulfate	60 + 40	10/24 + 5/15	30.0	6.5	1915	60 + 40	10/23 + 5/15	25	5	1453	
Ammonium Sulfate	100	10/24/2006	29.8	4.8	1677	100	10/23/2007	24	4	1271	
Ammonium Sulfate	120	10/24/2006	30.3	5.5	1646	120	10/23/2007	28	4	1214	
Ammonium Sulfate	100 + 40	10/24 + 5/15	30.5	6.5	1780	100 + 40	10/23 + 5/15	27	7	1447	
Ammonium Sulfate	140	10/24/2006	30.8	6.5	1849	140	10/23/2007	29	6	1289	
Ammonium Nitrate	60	10/24/2006	31.0	5.8	1712	60	10/23/2007	24	3	1278	
Ammonium Nitrate	60 + 40	10/24 + 5/15	30.8	6.8	1925	60 + 40	10/23 + 5/15	25	5	1363	
Ammonium Nitrate	100	10/24/2006	31.0	6.5	1787	100	10/23/2007	27	4	1277	
Ammonium Nitrate	120	10/24/2006	29.8	7.3	1827	120	10/23/2007	28	6	1347	
Ammonium Nitrate	100 + 40	10/24 + 5/15	30.0	8.0	1796	100 + 40	10/23 + 5/15	28	7	1540	
Ammonium Nitrate	140	10/24/2006	31.3	7.3	1852	140	10/23/2007	28	6	1539	
Coated Urea	60	10/24/2006	30.0	6.3	1585	60	10/23/2007	27	4	1199	
Coated Urea	60 + 40	10/24 + 5/15	30.3	6.8	1807	60 + 40	10/23 + 5/15	27	4	1364	
Coated Urea	100	10/24/2006	30.3	6.5	1898	100	10/23/2007	26	4	1261	
Coated Urea	120	10/24/2006	30.0	6.3	1681	120	10/23/2007	26	6	1482	
Coated Urea	100 + 40	10/24 + 5/15	30.5	6.8	1752	100 + 40	10/23 + 5/15	25	5	1527	
Coated Urea	140	10/24/2006	31.0	7.5	1641	140	10/23/2007	28	5	1537	
LSD @ 5% level					106	LSD @ 5% level					106

General Management:

5/18/2006 3/4 pt. 2,4-D + 3/4 pt. Banvel + 8oz Assurell
(Assure II applied alone)

5/26/2006 1 pt. Palisade

6/14/2006 10 oz. Quilt(Areas of rust infestation at harvest)

Harvest date:7/15/06 and 7/17/2006 based on maturity level

5/22/2007 3/4 pt. 2,4-D + 3/4 pt. Banvel + 10oz Assurell tank mixed

Growth regulator/Fungicide:

6/2/2007 8 oz. Apogee+3 oz. Headline

6/20/2007 10 oz. Quilt

Harvest date: 7/24/07

Table B4. 2006 and 2007 Nitrogen Fertilizer Trial Applied to 'Quest' (2006) and 'ASP6005' (2007) Perennial Ryegrass - Helmstetter Farm

Nitrogen Formulation	2006					2007				
	Application Rate	Application Timing	Harvest		Seed Yield	Application Rate	Application Timing	Harvest		Seed Yield
			Ht.(in.)	Lodging	lbs/A			Ht.(in.)	Lodging	lbs/A
Control	0	-	20.9	1.0	723	0	-	21	1	496
Urea	60	10/25/2006	22.8	1.5	976	60	10/23/2007	24	2	468
Urea	60 + 40	10/25 + 5/15	23.0	2.5	1185	60 + 40	10/23 + 5/15	23	4	894
Urea	100	10/25/2006	24.3	1.8	1110	100	10/23/2007	23	3	427
Urea	120	10/25/2006	24.3	1.8	1038	120	10/23/2007	23	3	545
Urea	100 + 40	10/25 + 5/15	24.3	4.0	1165	100 + 40	10/23 + 5/15	24	4	512
Urea	140	10/25/2006	25.0	1.0	1110	140	10/23/2007	21	4	529
Ammonium Sulfate	60	10/25/2006	23.0	1.0	949	60	10/23/2007	22	3	656
Ammonium Sulfate	60 + 40	10/25 + 5/15	20.5	3.5	1315	60 + 40	10/23 + 5/15	25	4	772
Ammonium Sulfate	100	10/25/2006	25.0	1.5	1155	100	10/23/2007	23	4	546
Ammonium Sulfate	120	10/25/2006	25.3	1.8	1114	120	10/23/2007	24	3	369
Ammonium Sulfate	100 + 40	10/25 + 5/15	24.8	5.0	1294	100 + 40	10/23 + 5/15	24	4	591
Ammonium Sulfate	140	10/25/2006	25.0	4.8	1162	140	10/23/2007	23	5	747
Ammonium Nitrate	60	10/25/2006	22.3	1.0	927	60	10/23/2007	22	3	528
Ammonium Nitrate	60 + 40	10/25 + 5/15	23.8	2.3	1176	60 + 40	10/23 + 5/15	22	3	579
Ammonium Nitrate	100	10/25/2006	25.0	1.3	1034	100	10/23/2007	22	2	736
Ammonium Nitrate	120	10/25/2006	24.0	2.0	1094	120	10/23/2007	22	3	600
Ammonium Nitrate	100 + 40	10/25 + 5/15	24.5	4.0	1165	100 + 40	10/23 + 5/15	24	4	673
Ammonium Nitrate	140	10/25/2006	24.0	1.5	1099	140	10/23/2007	22	4	684
Coated Urea	60	10/25/2006	24.0	1.8	1243	60	10/23/2007	22	2	669
Coated Urea	60 + 40	10/25 + 5/15	24.5	2.3	1126	60 + 40	10/23 + 5/15	22	3	368
Coated Urea	100	10/25/2006	25.8	3.5	1296	100	10/23/2007	23	4	661
Coated Urea	120	10/25/2006	26.8	5.5	1264	120	10/23/2007	24	4	500
Coated Urea	100 + 40	10/25 + 5/15	25.0	5.3	1169	100 + 40	10/23 + 5/15	24	5	583
Coated Urea	140	10/25/2006	26.0	6.8	1177	140	10/23/2007	22	3	642
LSD @ 5% level					69	NS				

General Management:

5/18/2006 3/4 pt. 2,4-D + 3/4 pt. Banvel

5/25/2006 1 pt. Palisade

6/15/2006 10 oz. Quilt

5/31/2007 3/4 pt. 2,4-D + 3/4 pt. Banvel+0.4pt.Puma

6/20/2007 10 oz. Quilt

Harvest date:7/14/06

Harvest date: 7/24/07

Table B5. 2006 and 2007 Nitrogen Fertilizer Trial Applied to 'Ragnar' (2006) and 'Ragnar II' (2007) Perennial Ryegrass - Magnusson Farms

Nitrogen Formulation	Application Rate	Harvest		Seed Yield (#/ac)	Application Rate	Harvest		Seed Yield (#/ac)	
		Ht.(in.)	Lodging			Ht.(in.)	Lodging		
Control	0	28.9	3.7	1403	0	20	1	499	
Urea	60	27.8	5.0	1452	60	26	3	1172	
Urea	100	30.0	5.8	1482	100	28	5	1323	
Urea	120	29.5	5.8	1780	120	30	6	1423	
Urea	140	31.5	6.3	1666	140	27	7	1269	
Ammonium Sulfate	60	29.5	5.3	1593	60	26	4	1263	
Ammonium Sulfate	100	30.5	6.5	1655	100	26	6	1122	
Ammonium Sulfate	120	29.0	6.3	1709	120	28	5	1192	
Ammonium Sulfate	140	28.8	5.8	1597	140	30	6	1121	
Ammonium Nitrate	60	30.0	5.5	1513	60	28	4	1325	
Ammonium Nitrate	100	29.3	6.3	1504	100	29	5	1277	
Ammonium Nitrate	120	28.3	5.5	1642	120	26	6	1358	
Ammonium Nitrate	140	28.8	6.0	1460	140	28	6	1348	
Coated Urea	60	27.5	4.0	1484	60	22	2	753	
Coated Urea	100	29.8	4.5	1187	100	23	2	839	
Coated Urea	120	29.3	4.8	1389	120	23	2	876	
Coated Urea	140	29.8	4.5	1378	140	23	2	793	
LSD @ 5% level				136	LSD @ 5% level				92

General Management:

5/18/2006 3/4 pt. 2,4-D + 3/4 pt. Banvel + 8oz Assurell
(Assure II applied alone)

5/26/2006 1 pt. Palisade

6/14/2006 10 oz. Quilt

Fertilizer Application Date: 5/16/2006

Harvest date: 7/15/06 and 7/17/2006 based on maturity level

5/22/2007 3/4 pt. 2,4-D + 3/4 pt. Banvel + 10oz Assurell

Growth regulator/Fungicide:

6/2/2007 8 oz. Apogee+3 oz. Headline

6/20/2007 10 oz. Quilt

Harvest date: 7/24/07

Table B6. 2006 and 2007 Nitrogen Fertilizer Trial Applied to 'Quest' (2006) and 'ASP6005' (2007) Perennial Ryegrass - Helmstetter Farm

Nitrogen Formulation	2006				2007			
	Application Rate	Harvest Ht.(in.)	Lodging	Seed Yield lbs/A	Application Rate	Harvest Ht.(in.)	Lodging	Seed Yield (#/ac)
Control	0	21.9	1.2	768	0	21	1	593
Urea	60	25.3	4.0	1142	60	23	3	643
Urea	100	25.5	5.8	1397	100	24	3	532
Urea	120	25.8	6.3	1386	120	24	6	784
Urea	140	24.8	5.8	1409	140	24	4	672
Ammonium Sulfate	60	24.0	4.3	1342	60	25	3	544
Ammonium Sulfate	100	25.8	6.0	1183	100	23	4	507
Ammonium Sulfate	120	24.3	5.5	1182	120	23	4	622
Ammonium Sulfate	140	25.8	7.2	1566	140	25	5	819
Ammonium Nitrate	60	25.3	4.8	1192	60	22	4	705
Ammonium Nitrate	100	26.0	5.5	1294	100	23	4	799
Ammonium Nitrate	120	25.0	6.5	1289	120	22	3	849
Ammonium Nitrate	140	23.7	7.0	1351	140	22	4	672
Coated Urea	60	22.3	2.0	995	60	21	2	609
Coated Urea	100	22.8	3.8	1092	100	22	2	653
Coated Urea	120	23.8	3.3	1163	120	21	2	401
Coated Urea	140	24.5	3.3	1289	140	23	3	613
LSD @ 5% level				123	NS			

General Management:

5/18/2006 3/4 pt. 2,4-D + 3/4 pt. Banvel
 5/25/2006 1 pt. Palisade
 6/15/2006 10 oz. Quilt

5/30 -3/4 pt. 2,4-D + 3/4 pt. Banvel+0.4pt.Puma
 6/20/2007 10 oz. Quilt

Fertilizer Application Date: 5/16/2006

Harvest date:7/14/06

Harvest date: 7/24/07