

PROGRESS REPORT ON SEED PRODUCTION RESEARCH

prepared by

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WEATHER:

Table 1. Monthly Precipitation at Roseau, MN 1967-1988.

KENTUCKY BLUEGRASS:

Table 2. Performance of Kentucky Bluegrass Varieties seeded in 1985.

TIMOTHY:

Table 3. Performance of Timothy Varieties seeded in 1984.

Table 4. Performance of Timothy Varieties seeded in 1985.

Table 5. Performance of Timothy Varieties seeded in 1987.

Table 6. Nitrogen rates, sources and time of application on Climax timothy seed yields, 1988.

Fig. 1-

Fig 4. Response of Climax timothy to nitrogen rates and sources, 1988.

REED CANARYGRASS:

Table 7. Performance of Reed Canarygrass Varieties seeded in 1985.

Table 8. Residue Management on Venture Reed Canarygrass, 1988.

Table 9. Parlay and Residue Management on Palaton Reed Canarygrass, 1988.

Overview of the 1988 Season

Poor soil moisture conditions and unusually high temperatures produced low seed yields on all trials harvested in 1988. A lack of moisture during the winter of 1987-1988 contributed to poor growing conditions early in the season (Table 1). Precipitation received in May, June and July was spotty throughout the region and occurred primarily as heavy rains during thunderstorms. The benefit from this precipitation was diminished due to the high temperatures and hard soil conditions.

In June, daily high temperatures averaged 10°F warmer and daily low temperatures averaged 5°F warmer than normal growing seasons. In July, daily high temperatures continued to be above normal by an average of 5°F. Moisture stress was a significant factor, especially during June when Roseau county had a Palmer Drought Index of -4.2 which indicated severe drought conditions.

Kentucky Bluegrass

The 1985 Kentucky bluegrass variety trial showed low yields on most varieties in the trial (Table 2). Park and two Northrup King strains, yielded significantly more seed than the other entries in the trial. The 1987 Kentucky bluegrass seeding was not harvested in 1988 due to the poor growing conditions, but will be harvested in 1989.

Timothy

The timothy trials suffered both heat and moisture stress. Temperatures over 100° F were recorded during the pollination of some of the earlier varieties. The 1987 timothy variety trial had the highest yields, the trial averaged 128 lb/A (Table 5). The trial was seeded on fallow ground in 1987 and was in its first production year. The earliest variety in the trial, Tiller, suffered extreme heat stress and had the lowest yields in the trial. The 1985 seeding suffered significant yield losses with 40% of the entries yielding essentially no seed and the trial averaged only 5 lb/A (Table 4). The 1984 seeding did slightly better than the 1985 seeding, however the average yield of the trial was only 18 lb/A (Table 3).

The Climax timothy study designed to look at the rate of nitrogen, source of nitrogen (urea vs. ammonium nitrate) and the time of application also suffered in the drought (Table 6, Figures 1-4). Seed yields did not differ significantly for the different fertilization rates, time of application or nitrogen source. At Cenex, the yields averaged 74 lb/A. The lower rates of nitrogen and the check plot often outyielded the higher nitrogen rates. At Grahn's, the yields averaged 34 lb/A. No lodging or nitrogen deficiencies were observed at either location regardless of the rate of nitrogen applied. In October, 1988, the plots previously receiving the high rates of ammonium nitrate could be identified in the study based on a visual observation of a dark green color indicating residual nitrogen in the soil.

Reed Canarygrass

The 1985 reed canarygrass trial yield also suffered from the environmental conditions (Table 7). Venture and Palaton were the highest yielding entries in the trial. Venture did yield significantly more seed than the other entries in the trial.

A residue management trial was conducted on Venture reed canarygrass which showed a spring burn to be the most advantageous residue management practice (Table 8). Plots which were burned in April, 1988 outyielded the clip and rake treatment in July, the check plots and the plots burned in the August, 1987.

The study to investigate the effect of parlay, a growth regulator, and residue management on Palaton reed canarygrass showed a trend towards higher seed yields in plots treated with 0.5 lb/A a.i. in October, 1987 or plots which received no parlay and had the residue removed by burning in August, 1987 (Table 9). Treated plots were shorter than the check plots, and seed yields decreased with increasing rates of Parlay. Residue management showed the August burn to be superior to either the July clipped and raked plots or the check plots where the residue was raked off at combine height.

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Table 1. Monthly precipitation and average Park Kentucky bluegrass seed yields at Roseau, MN from 1967 to 1988.

Year	MONTHLY PRECIPITATION (Inches)												TOTAL	DEPARTURE FROM NORMAL	Park Seed Yield TDS/7A
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC			
1967	1.13	.39	.59	2.89	.89	2.23	4.95	1.69	.83	1.11	.70	1.76	19.16	-56	650
1968	.62	T	1.25	.63	1.46	6.47	6.13	8.49	2.35	1.26	1.06	.21	29.98	+10.26	488
1969	3.07	.11	.05	1.27	3.31	2.29	3.70	4.28	3.29	1.91	.30	.73	24.31	+4.59	673
1970	.71	.41	1.38	2.56	5.93	4.07	3.55	.83	2.77	1.49	1.21	.37	25.28	+5.96	492
1971	.54	.13	.26	1.50	2.24	2.29	3.58	.69	3.33	2.97	.29	.50	19.02	-.70	405
1972	.68	.76	.50	.70	1.66	5.03	1.92	1.53	4.22	1.4	.38	.32	19.10	-.62	422
1973	.09	.17	1.18	.90	2.46	2.21	4.04	2.09	5.67	1.19	.67	.75	21.40	+1.68	642
1974	.88	.87	.16	2.72	4.12	1.56	2.56	10.97	.42	.66	.15	1.4	26.47	+5.43	504
1975	1.10	.29	.64	1.40	1.52	4.96	2.26	1.75	1.79	1.49	.20	.65	18.05	-2.94	146
1976	1.13	.50	1.05	.77	.54	5.82	1.52	3.72	.34	.07	T	.37	15.83	-5.16	140
1977	.14	.62	1.02	.27	2.43	3.71	2.28	1.74	3.83	.87	2.27	.26	19.44	-1.55	507
1978	.36	.26	.17	1.00	1.97	1.92	6.25	3.25	3.44	.23	.98	.79	20.62	+3.35	415
1979	.50	1.01	1.06	2.77	1.89	1.91	3.7	1.59	.45	1.40	1.02	.16	17.46	-3.53	62
1980	.55	.82	.35	.00	.24	1.75	3.35	5.19	4.12	1.66	.94	.18	19.15	-1.84	625
1981	.27	.16	.66	.56	2.79	6.85	2.63	2.41	3.63	1.75	.90	.99	23.60	+2.61	595
1982	1.30	.45	.74	.24	1.38	2.00	5.53	2.71	1.92	2.91	.46	.57	20.21	-.78	605
1983	1.31	1.26	1.17	.53	2.76	4.03	1.62	3.34	2.81	2.26	.66	.10	21.85	+86	613
1984	T	.95	T	.72	.72	4.46	3.78	.99	.37	4.32	.10	1.02	17.18	-3.21	525
1985	.12	.33	.06	1.07	4.35	4.62	1.08	8.72	1.6	1.04	1.68	.38	25.05	+5.06	488
1986	.30	.90	.26	2.96	1.4	2.43	3.59	2.04	2.52	.65	1.97	.36	19.38	-.61	288
1987	.47	.30	.10	.59	4.37	2.25	4.8	2.22	.82	.92	.73	.35	17.92	-2.00	152
1988	.60	.09	1.75	.00	1.74	1.34	5.53	1.70	2.24	.12	*2	*			

T Park seed yields estimated from Kentucky bluegrass variety trials with a July burn treatment and 80-100 lbs/A of nitrogen.

* Monthly precipitation data unavailable.

Table 2. Percent heading, mildew reading, plant height, harvest date, and seed yields for 24 Kentucky bluegrass strains seeded in 1985 on the Baumgartner (Wein) farm, Roseau, MN, 1986-1988.^a

Strain	MSP no.	Percent heading ^a		Powdery Mildew Rating ^b	Plant height (cm) ^c		Harvest date	Seed Yield (lb/A)				
		1988			1988			2-Yr. avg.			3-Yr. avg.	
		6-3	6-13		6-3	6-21		1986	1987	1988	1986	1987
Aquila	1915	15	92	R	18	20	6-29	244	68	156	54	122
Aspen	1039	23	95	MS	23	33	6-29	202	120	161	45	122
BA69-82	2368	23	97	R	17	25	6-29	285	202	244	56	181
BA70-131	2369	17	93	R	17	27	6-29	157	169	163	48	125
BA72-500	2370	23	97	R	22	25	6-29	312	214	263	57	194
BA72-503	2371	20	95	R	17	22	6-29	244	116	180	48	136
Banff	2230	50	100	S	33	35	6-26	71	235	153	54	120
Baron	2178	23	100	S	17	27	6-29	223	363	293	68	218
Dormie	1303	30	98	VR	22	28	6-26	692	138	415	71	300
Holiday	1752	12	85	R	20	20	6-29	107	50	79	18	58
K0-140	1587	82	100	R	38	43	6-22	303	211	257	184	233
K3-160	2378	35	100	R	33	45	6-29	140	146	143	48	111
K3-178	1815	32	97	S	23	30	6-29	74	279	177	56	136
K6-80	1817	75	100	VS	40	45	6-22	27	125	76	172	108
Kimono	1280	23	88	S	17	23	6-29	175	40	108	33	83
MomPp 2672	2182	20	98	R	15	25	6-30	252	202	227	27	160
Monopoly	1711	27	100	R	27	38	6-30	137	172	155	45	118
N6-106	1588	65	100	R	38	38	6-22	493	107	300	83	228
Newport	2372	35	98	S	28	28	6-28	398	324	361	80	267
Parade	1916	43	100	S	40	45	6-24	113	271	192	104	163
Park	2357	65	100	S	40	42	6-24	151	288	220	152	197
Plush	1753	33	100	MR	30	35	6-29	175	116	146	68	120
Rugby	1738	27	98	VS	25	28	6-29	98	279	189	77	151
Trenton	1810	32	100	VS	25	32	6-29	74	223	149	65	124
LSD at 5% =								98	82	40		
at 1% =								131	193	54		

^a Experimental design: RCB with 3 reps

^b Ratings averaged R = resistant; M = moderately resistant
MS = moderately susceptible

^c 2.5 cm=1 inch.

Table 3. Percent heading, plant height, harvest date and seed yields for Timothy strains seeded in 1984 on the Baumgartner Farm (Welln) Farm, Roseau, MN.^a

Strain	MSP no.	Percent heading			Plant height (cm) ^b		Harvest date 1988	Seed yields (lb/A)				
		1988			1988			3-Yr				
		6-3	6-13	6-27	6-6	7-7		1985	1986	1987	ave.	1988
Early maturing strains												
Climax	1743	0	5	47	33	53	7-20	538	339	538	472	5
Deploy	2343	2	23	67	40	67	7-20	324	523	321	389	19
Extremo	2197	17	52	73	45	78	7-11	523	523	354	467	21
FFR-Syn. W	2211	0	15	72	43	73	7-20	514	443	574	510	15
Kunpu	2358	28	55	82	40	82	7-11	359	451	378	396	57
Mohawk	2209	0	28	70	43	73	7-20	446	508	505	459	9
Mom Phi 21	2321	15	38	78	47	80	7-11	499	425	416	474	37
Mom Phi 28	2322	13	47	83	42	83	7-11	404	448	378	410	16
Mom Phi 30	2323	10	27	55	33	57	7-11	244	374	256	291	8
Mom Phi 32	2324	15	35	70	38	72	7-11	437	508	437	461	8
Mom Phi 56	2325	7	48	83	43	77	7-17	701	740	642	694	11
Mom Phi 59	2326	7	40	67	43	68	7-14	392	434	428	418	30
Mom Phi 62	2327	12	45	80	43	83	7-11	309	517	473	433	37
Mom Phi 63	2328	33	58	70	45	72	7-11	327	457	425	403	24
Mom Phi 64	2329	7	25	57	40	60	7-20	357	609	613	526	24
Mom Phi 69	2330	5	30	67	40	67	7-14	374	582	476	477	5
Nosappu	1593	0	12	58	38	62	7-20	745	466	500	570	4
Phn 1142	2349	0	22	70	38	72	7-20	576	653	553	594	55
Richmond	2232	4	42	67	42	68	7-17	591	481	431	501	5
SV-0906	1892	0	35	80	50	83	7-20	671	719	705	698	47
SV-0907	2089	0	22	75	40	75	7-20	743	505	660	636	26
SV-0908	2090	0	25	83	43	85	7-20	555	514	559	543	42
SV-0909	1894	0	33	82	43	83	7-20	520	627	636	594	42
SV-0910	2091	1	18	65	38	68	7-20	633	546	601	593	11
SV-0914	2092	0	12	72	38	75	7-20	621	508	502	544	3
SV-0916	2093	0	11	65	40	70	7-20	484	395	470	450	8
Intermediate maturing strains												
Bero	2342	0	6	38	35	45	7-20	487	419	398	435	2
ChAMPLain	1745	0	0	38	37	47	7-20	342	193	205	247	3
FFR-Syn. S	2210	0	5	62	40	65	7-20	484	383	505	457	4
FFR-Syn. Y	2212	0	17	77	43	77	7-20	493	425	517	478	14
Goliath	2014	0	5	45	25	50	7-20	472	416	482	457	5
K4-216	2142	2	12	70	45	75	7-20	487	347	392	409	17
Phn 962	2347	0	23	73	47	75	7-20	600	359	488	482	27
Phn 1042	2348	0	25	45	42	48	7-20	490	380	479	450	26
Tiiti	1704	0	28	77	38	78	7-20	591	226	615	477	24
Late maturing strains												
Heidemlj	1744	0	0	25	23	25	7-22	428	65	363	285	7
Hokushu	1511	0	0	20	28	28	7-20	288	208	285	260	7
Nobis	2344	0	5	65	33	65	7-17	86	77	33	65	13
Phn 242	2345	0	0	25	22	35	7-25	187	92	116	132	6
Phn 342	2346	0	3	28	27	32	7-22	250	65	62	126	8
								LSD at 5% =	202	153	146	30
								at 1% =	NS	202	193	40

^a Experimental Design: RCB with 3 reps

^b 2.5 cm = 1 Inch.

Table 4. Percent heading, plant height, harvest date and seed yields for Timothy strains seeded in 1985 on Baumgartner (Welln) Farm, Roseau, MN.

Strain	MSP no.	Plant height (cm) ^b					Harvest date 1987	Seed yields (lb/A)			
		Percent heading			1988			1986		2-Yr ave. 1988	
		6-3	6-21	6-28	6-3	7-7		1986	1987	ave.	1988
Early maturing strains											
Clair	1863	3	55	73	28	58	7-17	404	482	443	5
Climax	1743	0	43	80	28	67	7-20	555	517	536	2
Kampe II	1699	2	58	92	35	68	7-20	437	702	570	5
Kunpu	2358	23	62	70	28	63	7-7	466	500	483	7
M-11	2373	0	32	70	28	65	7-20	478	627	553	1
M-22	2374	0	30	55	25	63	7-20	592	561	577	1
Mohawk	2209	0	47	72	30	67	7-20	446	648	547	2
Mom Phi 21	2321	10	68	85	33	63	7-11	487	556	522	10
Mom Phi 28	2322	8	62	88	30	65	7-10	404	553	479	6
Mom Phi 30	2323	8	65	90	33	65	7-11	422	491	457	9
Mom Phi 32	2324	27	72	93	32	62	7-8	686	604	645	7
Mom Phi 56	2325	7	63	87	32	68	7-17	588	696	642	15
Mom Phi 59	2326	10	62	82	30	67	7-17	523	488	506	7
Mom Phi 62	2327	15	65	93	30	63	7-8	627	523	575	10
Mom Phi 63	2328	25	65	88	35	65	7-11	624	669	647	21
Mom Phi 64	2329	5	57	83	28	62	7-20	639	711	675	2
Mom Phi 69	2330	5	70	92	27	67	7-17	671	574	623	2
Nosappu	1593	0	73	93	35	73	7-20	544	642	593	4
SV-0906	1892	0	65	90	32	70	7-20	541	657	620	10
SV-0907	2089	0	57	85	32	67	7-20	546	633	590	2
SV-0908	2090	0	50	75	32	68	7-20	463	651	557	7
SV-0909	1894	1	57	83	28	67	7-20	469	633	551	21
SV-0910	2091	0	11	87	28	68	7-20	612	657	635	7
SV-0914	2092	0	47	87	27	65	7-20	496	681	589	1
SV-0916	2093	0	30	77	28	63	7-20	478	523	510	1
Timfor	992	0	65	90	27	63	7-20	549	553	551	1
Intermediate maturing strains											
Alma	2366	0	22	70	27	65	7-20	454	565	510	2
Champlain	1745	0	17	60	25	60	7-22	362	291	327	2
FFR Syn. S	2210	0	37	85	33	77	7-20	356	485	421	2
Gollath	2014	0	11	57	20	55	7-20	443	437	440	1
Motim	1702	0	10	28	20	53	7-25	321	330	326	4
Php-12	2364	0	20	55	23	62	7-20	472	562	517	1
Php-14	2365	0	18	60	23	65	7-20	496	464	480	1
WWT-100	2367	0	25	58	22	61	7-20	621	541	449	1
WW-Tigo	2363	0	20	63	22	57	7-20	674	613	644	1
TITIT	1704	0	33	78	30	68	7-20	493	404	449	1
Late maturing strains											
Heldemij	1744	0	17	30	17	58	7-25	30	250	140	9
Hokushu	1511	0	4	25	22	62	7-25	160	392	276	5
								LSD at 5% =	112	149	13
								at 1% =	149	198	17

^a Experiment design: RCB with 3 reps.

^b 2.5 cm = 1 inch.

Table 5. Percent heading, plant height, harvest date and seed yields for Timothy strains seeded in 1987 on Baumgartner (Welln) Farm, Roseau, MN.^a

Strain	MSP no.	Percent Heading			Plant Height (cm) ^b		Harvest	Seed Yield
		1988			1988		date	(lbs/A)
		6-3	6-13	6-28	6-6	7-5	1988	1988
Early maturity								
Clair	1863	17	95	100	36	84	7-8	169
Climax	1743	0	39	100	37	88	7-19	127
Kampe I	1699	4	79	100	40	83	7-21	156
Mohawk	2209	1	71	100	43	89	7-21	140
Tiller	2418	41	96	100	50	75	7-8	91
Intermediate Maturity:								
Erecta	1070	0	26	100	36	83	7-19	136
Goliath	2198	0	12	100	35	75	7-19	123
Motim	1702	0	1	93	31	74	7-26	98
Late Maturity:								
Heidemij	1744	0	0	79	22	74	7-29	158
Hokushu	1511	0	1	89	30	75	7-27	181

LSD at 5% = 38
1% = 51

^a Experimental Design: RCB with 4 reps
^b 2.5 cm = 1 inch

Table 6. The effect of nitrogen rate, time of application and nitrogen source on seed yields of established Climax timothy fields at two locations in Roseau, MN.^a

	Percent Heading		Plant Height (cm) ^b		Crude Protein ^c	Seed Yield (lbs/A)
	1988		1988			
	6-13	6-27	6-6	7-7	(%)	1988
CENEX - Fall Application						
<u>Ammonium Nitrate (lbs N/A)</u>						
40	9	66	40	80	6.4	100
80	11	74	44	82	6.4	92
120	8	71	41	80	6.8	66
160	9	66	40	75	7.7	84
200	5	68	37	80	8.4	59
<u>Urea (lbs N/A)</u>						
40	5	67	39	80	6.8	76
80	11	65	41	79	6.4	90
120	5	67	41	76	7.4	72
160	7	72	43	82	7.5	65
200	8	73	45	79	7.4	64
CENEX - Spring Application						
<u>Ammonium Nitrate (lbs N/A)</u>						
40	7	65	36	80	5.9	80
80	7	68	39	76	7.9	64
120	12	69	44	80	6.9	81
160	5	68	40	78	6.9	51
200	8	74	44	81	6.3	88
<u>Urea (lbs N/A)</u>						
40	6	66	40	76	6.5	57
80	5	64	39	77	7.0	65
120	12	75	44	84	5.8	110
160	5	70	38	79	7.3	41
200	4	65	40	74	7.0	66
<u>Check (lbs N/A)</u>						
0	7	66	40	80	5.6	85
LSD (0.05)	9	13	7	8	2.1	92

Table 6. (Continued) The effect of nitrogen rate, time of application and nitrogen source on seed yields of established Climax timothy fields at two locations in Roseau, MN.^a

	Percent Heading 1988		Plant Height (cm) ^b 1988		Crude Protein ^c	Seed Yield
	6-13	6-27	6-6	7-7	(%)	(lbs/A) 1988
GRAHN - Fall Application						
<u>Ammonium nitrate (lbs N/A)</u>						
40	2	38	27	72	7.3	13
80	5	50	34	75	7.7	50
120	5	51	35	51	8.0	44
160	3	44	31	74	7.7	25
200	2	34	32	70	8.2	19
<u>Urea (lbs N/A)</u>						
40	4	44	31	74	6.6	29
80	4	54	30	74	6.9	36
120	4	50	33	76	7.2	34
160	4	56	35	78	5.8	44
200	3	40	32	72	7.6	20
GRAHN - Spring Application						
<u>Ammonium nitrate (lbs N/A)</u>						
40	3	46	31	74	6.8	38
80	3	49	32	77	7.1	53
120	2	43	29	76	8.5	36
160	4	49	34	74	8.0	28
200	5	54	34	75	7.3	39
<u>Urea (lbs N/A)</u>						
40	3	49	34	74	7.2	41
80	2	42	34	72	8.4	26
120	4	45	34	71	7.9	33
160	4	54	32	74	7.4	52
200	5	46	32	74	8.0	39
<u>Check (lbs N/A)</u>						
0	2	35	29	69	7.2	24
LSD (0.05)	3	13	4	7	1.3	40

Figure 1. - Figure 4. Seed yields of Climax timothy in response to nitrogen fertilizer rates and sources. The data is presented by location and time of application. The R^2 values on the figures give an indication as to how well the data fits the curve. The R^2 values can range from zero to one. An $R^2=0.00$ would indicate the data do not fit the curve while an $R^2=1.00$ would indicate the data fit the curve perfectly. The spring applications of urea at both locations indicate a very poor fit of the data to the curves.

Fig. 1. Cenex - Fall applied nitrogen.

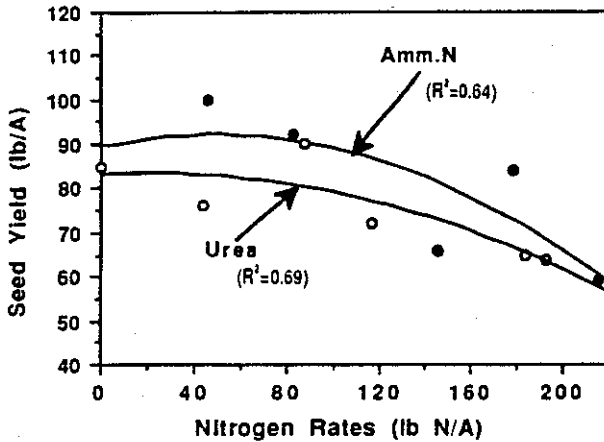


Fig. 2. Cenex - Spring applied nitrogen

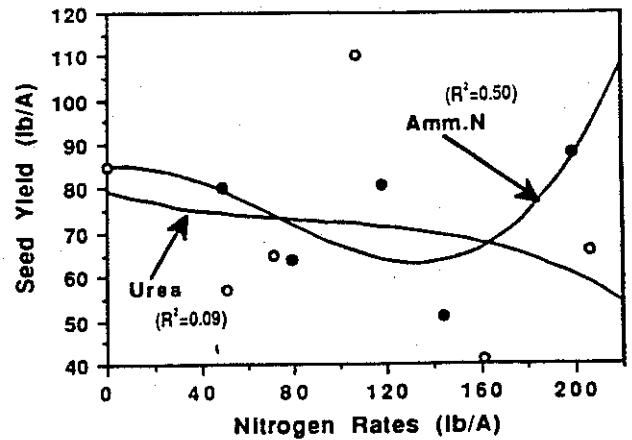


Fig. 3. Grahn - Fall applied nitrogen.

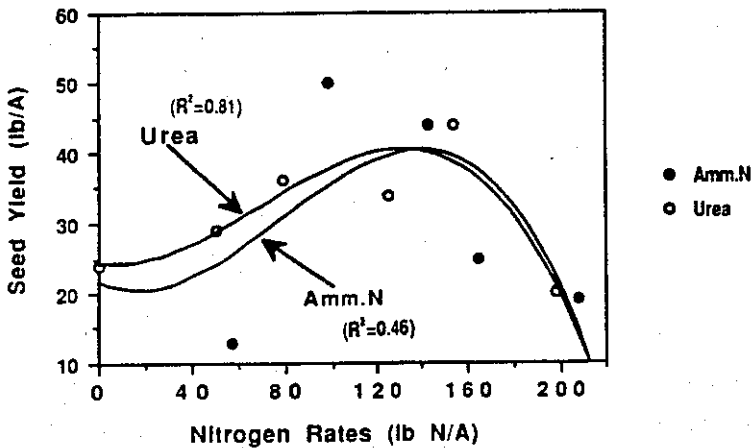


Fig. 4. Grahn - Spring applied nitrogen.

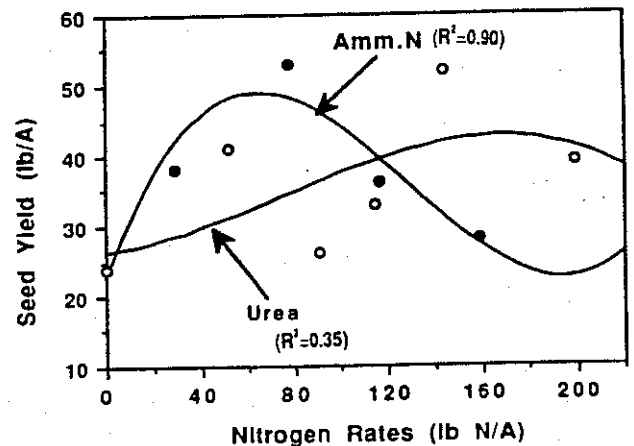


Table 7. Plant height, harvest date, and seed yields for 8 reed canarygrass strains seeded in 1985 on the Baumgartner (Welln) farm, Roseau, MN.^a

Strain	MSP no.	Plant height (cm) ^b		Seed yields (lb/A)				
		6-6	6-28	Est. 1986 ^c	1986	1987	1988	3 yr. avg.
MN-76	1734	62	118	167	56	169	22	82
NAPB 427901	1851	57	117	450	309	339	57	235
NAPB 427902	1852	53	117	417	262	526	56	281
Flare	1983	57	123	417	205	268	39	171
Palaton (PS-3)	2199	62	122	500	324	392	73	263
Rise	1615	58	118	350	190	363	39	197
Vantage	1616	55	122	350	238	404	43	228
Venture (PS-2A)	2200	60	122	500	232	363	112	236
		LSD at 5% level		43	145		35	
		at 1% level		60	201		48	

^a All plots harvested on 7-01-88. Experimental Design: RCB with 3 reps.

^b 2.5 cm=1 inch.

^c Harvested 7-7-86 after much seed had shattered. Estimate of seed production is given to support seed yield.

Table 8. Residue management on Venture Reed canarygrass.

Treatment	Percent heading			Plant height (cm)		Seed yield
	6-6	6-18	6-28	6-3	6-28	(lbs/A)
Spring Burn (4-11-88)	25a ²	87a	100a	65 ^a	120a	136a
Fall Clip/Rake (7-23-87)	4b	45bc	77bc	50b	112ab	32b
Fall Burn (8-2-87)	5b	30c	63c	43c	110b	18c
Check	2b	62b	87ab	50b	117ab	31b
LSD (0.05)	6	19	17	3	9	12

¹ Experimental Design: CRD with 3 reps
100 lbs/A nitrogen applied on 10-20-87.

² Means within columns followed by same letter are not significantly different at the 5% probability level.

Table 9. The effect of a growth regulator (Parlay) and residue management on seed yield of Palatou reed canarygrass.

Fall Burn	Percent heading		Plant height (cm)		DM Yield lbs/A	Seed Yield lbs/A	Harvest Index %	Seed head number no./sq. m	Seed head length cm	Maturity
	6/13	6/23	6/6	6/30						
	Parlay Treatment									
0.0 lbs/A a.i.	5	44	59	91	2415	39	1.4	68	86	1.7
0.0 lbs/A a.i. - Fall	2	38	53	85	2309	43	1.6	78	81	1.5
0.5 lbs/A a.i. - Spring	2	37	51	76	1739	20	1.2	49	79	1.4
1.0 lbs/A a.i. - Spring	3	32	49	74	1883	17	0.9	49	81	1.1
Clip/Rake										
Parlay Treatment										
0.0 lbs/A a.i.	2	35	46	68	1797	11	0.6	48	71	1.0
0.5 lbs/A a.i. - Fall	2	24	43	58	1809	14	0.8	44	73	1.3
0.5 lbs/A a.i. - Spring	1	32	44	73	1930	15	0.7	54	75	1.1
1.0 lbs/A a.i. - Spring	3	37	42	66	1516	18	0.8	51	70	1.1
Check (Rake)										
Parlay Treatment										
0.0 lbs/A a.i.	1	29	55	79	1795	20	1.0	53	74	1.1
0.5 lbs/A a.i. - Fall	1	26	47	70	1623	9	0.6	41	72	1.0
0.5 lbs/A a.i. - Spring	0	22	47	59	1557	6	0.4	37	73	1.0
1.0 lbs/A a.i. - Spring	0	26	48	68	1503	3	0.4	31	76	1.0
Standard Error	3	15	6	11	927	33	1.0	45	15	0.6