

PROGRESS REPORT ON SEED PRODUCTION RESEARCH

prepared by

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for

PRESENTATION AT THE GRASS-LEGUME SEED INSTITUTE
Baudette, Minnesota

March 15, 1988

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Table a. 1987 Weather at Roseau

Poor soil moisture conditions were present in the Spring, 1987 probably due to lack of spring rainfall until May 19 and the unseasonably high air temperatures in the spring and summer. The mild winter conditions of 1986-87 prevented winter injury on most crops even with the poor snow cover. The extremely hot and dry weather which occurred in the second half of June probably caused a reduction in optimum yields of some grasses. Kentucky bluegrass was probably most affected because pollination and seed fill occurred during this weather resulting in lower than average seed yields in 1987.

Reed canarygrass was harvested earlier than usual in 1987 due to the weather conditions. The weather throughout the summer remained generally favorable for harvesting the later maturing species, especially Timothy and Birdsfoot trefoil.

Table 1. 1985 Kentucky Bluegrass Variety Trial

Harvest date was 3 to 7 days earlier than in 1986 due to the warm, dry weather conditions. Seed yields varied over years with approximately half of the varieties producing greater yields than in 1986. Mildew was present in the early part of the growing season, but the severity of the infection present in the trial was less than the previous year. Late season rains which produced an abundance of regrowth on Kentucky bluegrass may have contributed to the low seed yields observed on some of the strains in the trial.

Table 2 and 3. 1984 and 1985 Timothy Variety Trials

Overall seed yields were good to excellent for Timothy in both the 1984 and 1985 variety trials. Harvest date was 4 to 8 days earlier than in 1987 due to the weather conditions. Seed yields were inconsistent for the early maturing strains in the 1984 variety trial with over half of the entries producing lower seed yields than in 1986. However, the 1985 trial seed yields were equal to or greater than the seed yields in 1986 for 80% of the entries.

Table 4 and 5. 1984 and 1985 Reed Canarygrass Variety Trials

Harvest dates in 1987 for the reed canarygrass trials was the earliest observed over the years. Overall seed yields in the 1984 variety trial were considerably lower in 1987 than in 1986 or 1985. The 1985 variety trial produced greater seed yields in 1987 than 1986 because of severe seed shattering losses in 1986.

Table a. Monthly precipitation at Roseau, MN 1967-1987, with some average Kentucky bluegrass seed yields from 1968-1987.

Month	Year												1987								
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978		1979	1980	1981	1982	1983	1984	1985	1986
January	1.13E ^a	.62	3.07	.71	.54	.68	.09	.88	1.10E	1.13	.14	.36	.50	.55	.27	1.30	1.31	T	.12	.30	.47
February	.39	T	.11	.41	.13	.76	.17	.87	.29E	.50	.62	.26	1.01	.82	.16	.45	1.26	.95	.33	.90	.30
March	.59	1.25	.05	1.38	.26E	.50E	1.18	.16	.64E	1.05	1.02	.17	1.06	.35	.66	.74	1.17	T	.06	.26	.10
April	2.89	.63	1.27	2.56	1.50	.70	.90	2.72	1.40	.77	.27	1.00	2.77	.00	.56	.24	.53	.72	1.07	2.96	.59
May	.89	1.46	3.31	5.93	2.24	1.66	2.46	4.12	1.52	.54	2.43	1.97	1.89	.24	2.79	1.38	2.76	.72 ^b	4.35	1.40	4.37
June	2.23	6.47	2.29	4.07	2.29	5.03	2.21	1.56	4.96	5.82	3.71	1.92	1.91	1.75	6.85	2.00	4.03	4.46	4.62	2.43	2.25
July	4.95	6.13	3.70	3.55	3.58	1.92	4.04	2.56E	2.26	1.52	2.28	6.25	3.70	3.35	2.63	5.53	1.62	3.78	1.08	3.59	4.80
August	1.69	8.49	4.28	.83	.69	1.53	2.09	10.97	1.75	3.72	1.74	3.25	1.59	5.19	2.41	2.71	3.34	.99	8.72	2.04	2.22
September	.83	2.35	3.29	2.77	3.33	4.22	5.67	.42	1.79	.34	3.83	3.44	.45	4.12	3.63	1.92	2.81	.37	1.60	2.52 ^b	.82
October	1.11	1.26	1.91	1.49	2.97	1.40	1.19	.66	1.49	.07	.87	.23	1.40	1.66	1.75	2.91	2.26	4.32	1.04	.65 ^b	.92
November	.70	1.06	.30	1.21	.29	.38	.67	.15	.20	T	2.27	.98	1.02	.94	.90	.46	.66	.10	1.68 ^b	1.97 ^b	.73
December	1.76E	.21	.73	.37	.50E	.32	.75	1.40	.65E	.37	.26	.79	.16	.18	.99	.57	.10	1.02	.38	.36 ^b	.35
Total	19.16	29.98	24.31	25.28	19.02	19.10	21.40	26.47	18.05	15.83	19.44	20.62	17.46	19.15	23.60	20.21	21.85	17.18	25.05	19.38	17.92
Departure from normal																					
Kentucky bluegrass seed yields ^c		650	448	673	492	405	422	642	504	146	140	507	415	62	625	595	605	613	525	488	288

^a E=estimated rainfall.

^b Roseau data missing—this is Harrood reading.

^c All from Park variety, July burn treatment, with 80 to 100 lbs of nitrogen per acre.

Table 1. Percent heading, mildew reading, plant height, harvest date, lodging and seed yields for 24 Kentucky bluegrass strains seed in 1985 on Baumgartner (Wellin) farm, Roseau, MN, 1986-1987.

Strain	MSP no.	Percent heading ^a		Mildew ^b		Plant height (cm) ^c		Harvest date 1987	Lodging ^d 6-17-87	Seed Yield (lb/A)		2-Year average
		1987		1987		1987				1986	1987	
		5-14	5-27	4-27	5-14	5-27	6-22					
Aquila	1915	0	T	0	1.0	23	50	7-2	1.7	244	68	156
Aspen	1039	0	22	0	T	30	58	7-1	2.4	202	120	161
BA69-82	2368	0	7	0	0	27	53	7-5	1.3	285	202	244
BA70-131	2369	0	12	0	T	28	58	7-5	1.3	157	169	163
BA72-500	2370	0	10	0	0	27	55	7-3	1.0	312	214	263
BA72-503	2371	0	5	0	T	22	55	7-3	1.0	244	116	180
Banff	2230	0	43	T	0.8	35	60	6-30	1.8	71	235	153
Baron	2178	0	0	0.4	1.4	27	57	7-1	1.0	223	363	293
Dormie	1303	0	12	0	T	27	58	7-2	1.0	692	138	415
Holiday	1752	0	0	0	T	27	53	7-1	2.3	107	50	79
KO-140	1587	15	68	0	T	48	65	6-22	3.8	303	211	257
257160	2378	0	19	0.4	1.8	42	65	7-1	3.0	140	146	143
K3-178	1815	0	27	T	2.0	35	65	7-1	1.4	74	279	177
K6-80	1817	2	53	T	2.4	40	72	6-22	1.0	27	125	76
Kimono	1280	0	0	0	2.8	22	43	7-2	1.3	175	40	108
MomPp 2672	2182	0	0	0	0.8	27	57	7-7	1.0	252	202	227
Monopoly	1711	0	4	0	0	33	68	7-3	2.3	137	172	155
N6-106	1588	10	45	0	T	42	67	6-26	4.0	493	107	300
Newport	2372	0	17	T	1.3	33	60	6-28	1.1	398	324	361
Park	2357	T	57	0	1.0	45	63	6-22	2.9	151	288	220
Parade	1916	0	40	0.7	1.3	38	63	6-25	2.4	113	271	192
Plush	1753	0	32	T	0.4	32	58	7-3	2.1	175	116	146
Rugby	1738	0	17	T	1.5	28	63	6-30	1.3	98	279	189
Trenton	1810	7	27	0.7	2.0	30	62	7-1	1.8	74	223	149

LSD at 5% = 98 82
at 1% = 131 193

^a T=trace, <1% heading.

^b 0=no mildew; T=trace; 5=severe infection.

^c 2.5 cm=1 inch.

^d 1.0=no lodging, 5.0=severe lodging.

Table 2. Vigor, percent heading, plant height, lodging, harvest date and seed yields for Timothy strains seeded in 1984 on the Baumgartner Farm (Wellin) Farm, Roseau, MN.

Strain	MSP no.	Vigor ^a 4-28-87	Plant height (cm) ^c					Lodging ^d 6-17-87	Harvest date 1987	Seed yields (lb/A)			3-Year average
			Percent heading ^b 1987			1987				1985	1986	1987	
			6-1	6-12	6-23	6-12	7-31						
Early maturing strains													
Climax	1743	8.3	0	25	97	78	122	1.0	7-29	538	339	538	472
Deploy	2343	9.0	5	60	98	77	107	2.0	7-24	324	523	321	389
Extremo	2197	7.0	20	83	98	78	100	2.0	7-19	523	523	354	467
FFR-Syn. W	2211	8.3	0	65	98	82	118	2.1	7-26	514	443	574	510
Kunpu	2358	8.7	28	92	98	87	103	2.3	7-14	359	451	378	396
Mohawk	2209	8.7	0	52	98	80	115	2.2	7-26	446	508	505	459
Mom Phl 21	2321	8.0	17	82	98	80	100	3.7	7-13	499	425	416	474
Mom Phl 28	2322	9.0	17	82	98	82	107	2.9	7-13	404	448	378	410
Mom Phl 30	2323	8.0	15	80	98	80	97	3.0	7-15	244	374	256	291
Mom Phl 32	2324	7.3	27	92	98	80	95	2.4	7-14	437	508	437	461
Mom Phl 56	2325	7.7	7	82	98	83	105	3.0	7-21	701	740	642	694
Mom Phl 59	2326	8.0	4	80	98	80	105	3.1	7-21	392	434	428	418
Mom Phl 62	2327	8.3	18	85	98	78	103	2.9	7-16	309	517	473	433
Mom Phl 63	2328	8.7	28	83	98	75	93	2.7	7-13	327	457	425	403
Mom Phl 64	2329	8.7	T	75	98	78	105	2.0	7-21	357	609	613	526
Mom Phl 69	2330	8.7	10	85	98	80	103	2.7	7-17	374	582	476	477
Nosappu	1593	9.0	3	60	98	73	102	2.3	7-23	745	466	500	570
Phn 1142	2349	7.3	0	53	98	70	108	1.8	7-28	576	653	553	594
Richmond	2232	7.7	T	70	98	77	110	2.1	7-18	591	481	431	501
SV-0906	1892	8.0	0	63	98	78	113	3.1	7-28	671	719	705	698
SV-0907	2089	8.3	0	48	98	77	105	3.0	7-29	743	505	660	636
SV-0908	2090	7.3	0	45	98	75	105	3.8	7-29	555	514	559	543
SV-0909	1894	8.0	0	58	98	78	107	3.1	7-29	520	627	636	594
SV-0910	2091	8.0	0	75	98	80	103	2.8	7-25	633	546	601	593
SV-0914	2092	7.3	0	58	98	72	103	2.4	7-29	621	508	502	544
SV-0916	2093	7.3	0	25	97	73	105	2.7	7-29	484	395	470	450
Intermediate maturing strains													
Bero	2342	8.3	0	58	98	73	103	1.5	7-26	487	419	398	435
Champlain	1745	9.0	0	T	90	77	132	1.1	8-6	342	193	205	247
FFR-Syn. S	2210	8.3	0	22	96	77	118	2.1	7-25	484	383	505	457
FFR-Syn. Y	2212	8.0	0	62	98	80	118	2.8	7-29	493	425	517	478
Gollath	2014	8.7	0	20	97	67	107	1.4	7-28	472	416	482	457
K4-216	2142	8.0	0	35	97	83	125	1.9	8-1	487	347	392	409
Phn 962	2347	6.7	0	43	98	75	107	2.4	7-29	600	359	488	482
Phn 1042	2348	7.7	0	53	97	75	102	2.9	7-31	490	380	479	450
Tiltl	1704	8.0	0	33	96	73	105	3.1	7-30	591	226	615	477
Late maturing strains													
Heidemij	1744	8.7	0	0	45	55	98	1.0	8-8	428	65	363	285
Hokushu	1511	7.7	0	0	77	62	107	1.1	8-7	288	208	285	260
Nobis	2344	8.3	0	25	88	40	77	1.0	8-8	86	77	33	65
Phn 242	2345	9.0	0	6	78	43	77	1.0	8-8	187	92	116	132
Phn 342	2346	8.7	0	20	85	47	62	1.7	8-8	250	65	62	126
										LSD at 5%	= 202	153	146
										at 1%	= NS	202	193

^a 1=least vigorous; 9=most vigorous.

^b T=trace, <1% heading.

^c 2.5 cm=1 inch.

^d 1.0=no lodging; 5.0=severe lodging.

Table 3. Vigor, percent heading, plant height, lodging, harvest date and seed yields for Timothy strains seeded in 1985 on Baumgartner (Welin) Farm, Roseau, MN.

Strain	MSP no.	Vigor ^a 4-28-87	Percent heading ^b 1987			Plant height (cm) ^c 1987		Lodging ^d 6-17-87	Harvest date 1987	Seed yields (lb/A)		2-Year average	
			6-6	6-12	6-19	5-27	7-31			1986	1987		
			Early maturing strains										
Clair	1863	8.0	33	72	97	50	107	2.1	7-16	404	482	443	
Climax	1743	8.0	0	25	95	48	115	1.0	7-30	555	517	536	
Kampe II	1699	6.3	8	65	87	48	103	2.3	7-23	437	702	570	
Kunpu	2358	8.7	53	92	97	52	107	1.3	7-13	466	500	483	
M-11	2373	7.7	8	70	100	42	118	1.0	7-21	478	627	553	
M-22	2374	8.3	6	75	112	42	125	1.0	7-21	591	562	577	
Mohawk	2209	7.7	0	42	95	47	112	2.0	7-25	446	648	547	
Mom Phi 21	2321	8.7	27	68	97	50	102	2.8	7-16	487	556	522	
Mom Phi 28	2322	8.3	27	77	97	52	107	1.9	7-18	404	553	479	
Mom Phi 30	2323	8.0	32	80	93	50	100	2.0	7-18	422	491	457	
Mom Phi 32	2324	8.3	45	83	95	52	97	1.8	7-16	686	604	645	
Mom Phi 56	2325	6.7	25	82	87	47	105	2.4	7-21	588	696	642	
Mom Phi 59	2326	7.0	22	80	97	52	108	2.0	7-21	523	488	506	
Mom Phi 62	2327	8.3	32	77	83	52	98	2.3	7-16	627	523	575	
Mom Phi 63	2328	8.0	45	85	87	50	98	1.7	7-15	624	669	647	
Mom Phi 64	2329	7.3	5	75	92	47	105	1.0	7-22	639	711	675	
Mom Phi 69	2330	7.7	27	88	100	48	117	1.4	7-19	671	574	623	
Nosappu	1593	6.3	T	60	100	43	113	2.4	7-26	544	642	593	
SV-0906	1892	6.0	10	62	90	47	105	2.7	7-26	582	657	620	
SV-0907	2089	6.0	T	55	92	43	108	2.1	7-30	546	633	590	
SV-0908	2090	6.7	0	43	90	42	102	2.3	7-30	463	651	557	
SV-0909	1894	6.0	4	58	95	45	107	2.4	7-28	469	633	551	
SV-0910	2091	7.7	9	70	87	48	100	2.7	7-25	612	657	635	
SV-0914	2092	6.0	0	55	85	38	100	1.8	7-25	496	681	589	
SV-0916	2093	6.0	0	33	85	43	98	2.1	7-28	478	523	501	
Timfor	992	7.0	0	53	93	43	108	1.3	7-27	549	553	551	
Intermediate maturing strains													
Alma	2366	4.7	T	43	88	37	100	1.7	7-27	454	565	510	
Champlain	1745	6.3	0	T	92	40	127	1.0	8-7	362	291	327	
FFR Syn. S	2210	6.7	0	4	90	47	113	1.8	8-4	356	485	421	
Goliath	2014	7.0	0	33	87	42	102	1.4	7-28	443	437	440	
Motim	1702	7.3	0	10	80	35	102	1.0	8-5	321	330	326	
Php-12	2364	6.3	0	55	88	40	105	1.0	7-27	472	562	517	
Php-14	2365	7.0	0	28	88	42	108	1.1	7-31	496	464	480	
WWT-100	2367	7.3	7	72	92	40	103	1.0	7-25	621	541	581	
WW-Tigo	2363	8.0	9	73	93	42	103	1.9	7-28	674	613	644	
Titi	1704	6.3	0	22	83	37	105	1.7	8-1	493	404	449	
Late maturing strains													
Heidemij	1744	5.7	0	0	57	27	100	1.0	8-7	30	250	140	
Hokushu	1511	7.0	0	0	70	35	103	1.0	8-7	160	392	276	
										LSD at 5% =	112	149	
										at 1% =	149	198	

^a 1=least vigorous; 9=most vigorous.

^b T=trace, <1% heading.

^c 2.5 cm=1 inch.

^d 1.0=no lodging; 5.0=severe lodging.

Table 4. Plant height and seed yields for 8 reed canarygrass strains seeded in 1984 on the Baumgartner (Welln) farm, Roseau, MN.

Strain	MSP no.	Plant height (cm) ^a		Seed yields (lb/A)			3-Year average
		6-10-87	6-26-87	7-8-85	7-4-86	6-29-87	
Flare	1983	92	155	570	416	244	410
MN-76	1734	85	150	327	175	80 ^b	194
Palaton (PS-3)	1985	88	147	820	580	333	578
Palaton (PS-3)	2236	90	140	763	562	291	539
Rise	1853	90	153	570	395	223	396
Vantage	1854	90	153	600	520	208	443
Venture (PS-2A)	1984	92	155	751	550	244	515
Venture (PS-2A)	2200	90	140	829	535	229	531
			LSD at 5% level	176	144	136	
			at 1% level	244	199	189	

^a 2.5 cm=1 Inch.

^b MN-76 harvest on 6-26-87.

Table 5. Plant height, harvest date, and seed yields for 8 reed canarygrass strains seeded in 1985 on the Baumgartner (Welln) farm, Roseau, MN.

Strain	MSP no.	Plant height (cm) ^a		Harvest date 1987	Seed yields (lb/A)		
		6-10-87	6-26-87		Est. 1986 ^b	1986	1987
MN-76	1734	92	157	6-25	167	56	169
NAPB 427901	1851	97	163	6-28	450	309	339
NAPB 427902	1852	100	157	6-28	417	262	526
Flare	1983	98	150	6-28	417	205	268
Palaton (PS-3)	2199	98	158	6-27	500	324	392
Rise	1615	97	162	6-28	350	190	363
Vantage	1616	97	162	6-28	350	238	404
Venture (PS-2A)	2200	95	152	6-27	500	232	363
			LSD at 5% level		43	145	
			at 1% level		60	201	

^a 2.5 cm=1 Inch.

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

Table 6. 1987 Parlay Treatment on 'Park' Kentucky Bluegrass

In October of 1986, Parlay at 0.2 lb/A a.i. was applied on 6.8 acres on a 1986 seeding of Park Kentucky bluegrass on the Steve Dahl farm. Observation of the field in early May showed the incidence of mildew to be less on the treated area. Twelve samples were collected prior to harvest from the treated and the untreated portions of the field. The parlay treatment seed yields averaged 75% more than the untreated check.

Table 6. 1987 seed yields of Park Kentucky bluegrass treated with Parlay on a 1986 seeding on the Steve Dahl farm in Roseau, MN.

Sample	Seed Yields (lb/A)	
	Untreated	Treated (0.2 lb/A a.i.)
1	285	428
2	241	384
3	241	330
4	187	294
5	205	508
6	205	455
7	277	428
8	187	294
9	205	535
10	259	544
11	250	348
12	214	321
MEAN	229.7	405.9

Table 7. 1987 Parlay Treatment on 'Palaton' Reed Canarygrass

Two studies were initiated on reed canarygrass to determine residue management strategies. The first study is on Vantage reed canarygrass and includes four treatments: 1) fall burn, 2) clip and rake, 3) spring burn, and 4) no treatment. Seed was harvested off of each of the plots in June, 1987 prior to treatment and averaged 772 lb/A.

The second study is on a field of Palaton reed canarygrass located on the Mike Baumgartner farm in Roseau. The study involves looking at a growth regulator to reduce the crop height followed by a residue management study. Parlay was applied on May 22, 1987 at 2 rates and on October 15, 1987 at 1 rate. The seed was harvested off all plots on June 28 and June 29, 1987.

The residue management treatments were burn after harvest, clip and rake off the residue, and no treatment. The plots were treated in mid July with the residue management. The seed yields only reflect the effect of the spring applications of Parlay. The effect of Parlay on seed yield and plant height was small. This probably resulted from the late application of the chemical than originally planned due to an unavailability of the chemical in Minnesota. The study will be continued for the next two years.

Table 7. Seed yield, harvest index, plant dry weight, height, heading, seed head number, seed head length, and color of Palaton reed canarygrass treated with Parlay at 0.0, 0.5, and 1.0 lb/A a.i. on May 22, 1987.

Parlay treatment	Seed yield	Harvest Index ^a	Plant dry weight	Plant height			Heading		Seed head number	Seed head length	Color ^b
				5-22	6-20	6-26	6-10	6-17			
lb/A a.i.	lb/A	- % -	- gm -	- - - - cm - - - -			- - % - -				
0.0	680.0	9.8	768.7	50.6	145.2	151.1	29.4	90.4	36.6	106.9	3.4
0.5	690.0	10.1	758.7 ^c	48.5	142.1	148.7	24.2	90.4	35.1	110.3 ^c	3.1
1.0	715.8	10.0	796.7	51.0	141.1 ^c	148.3	30.8	91.3	37.4	112.3	3.2
LSD (0.05)	56.4	.7	35.2	3.7	3.7	3.3	7.3	3.0	3.2	3.5	0.3

^a Harvest Index = (seed yield(gm)/plant dry weight(gm)) X 100.

^b Color rating scale from 1 to 5: 1=0% to 20% dark seed; 5=80% to 100% dark seed.

^c Significantly different at the alpha=0.05 level.

Additional Research Projects in Roseau, MN

A fertility study on Climax timothy was initiated in October, 1987. The study will compare two fertilizer sources, ammonium nitrate and urea, applied in the spring or the fall at 5 different rates. The study is being done at two different locations, on the Dave Grahn farm near Roseau and on the Cenex land in Roseau.

Native grasses were established in June, 1987 on the Cenex land to determine the potential seed production on a number of different species of prairie grasses. The study is in cooperation with the Soil Conservation Service which supplied the seed stocks of 13 varieties or experimentals which include the species big bluestem, little bluestem, indiagrass, sideoats grama, and switchgrass. Low to moderate seed yields are projected for 1988 since the native grasses are slower to establish than the cool-season grasses. Optimum seed yields can be anticipated in 1989.

Two new variety trials were seeded in August, 1987. The timothy trial contains 10 entries, only one is new to the area, Tiller timothy, from Van der Hove, Netherlands. The Kentucky bluegrass variety trial contains 36 entries of which 15 are new or relatively new strains to be tested in the area.