

Progress Report on Seed Production Research

prepared by

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1986 Weather at Roseau

Good soil moisture in the fall of 1985 was beneficial for good seed production of grass-legume crops in 1986. Adequate snowfall helped keep soil temperatures warm enough to avoid serious winter injury in all but the more sensitive crops.

Spring rainfall was generally adequate. There was a slight topsoil moisture shortage at the end of May, in addition to daytime high temperatures the last five days of May of 90°F or above. These conditions probably caused a reduction in the optimum yields of some grasses, especially Kentucky bluegrass.

Hard rains and high winds on July 3 caused shattering on some Kentucky bluegrass strains but more importantly on Reed canarygrass that was ripening at that time. Reed canarygrass' erect growth makes it especially vulnerable to shattering while the crop is ripening just before harvest.

Weather throughout July and August was generally favorable for Timothy and Perennial ryegrass with no prolonged hot or dry periods. Harvest time had no prolonged wet period as there was in 1985.

Weather for Birdsfoot trefoil seed production was also good. There was only one day, August 15, when the temperature was 94°F and relative humidity 35%, that pod shattering would have been a problem.

Table a. Monthly precipitation at Roseau, MN 1966-1986, with some average Kentucky bluegrass seed yields from 1968-1986.

Month	Year																				
	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
January	.56	1.13E*	.62	3.07	.71	.54	.68	.09	.88	1.10E	1.13	.14	.36	.50	.55	.27	1.30	1.31	T	.12	.30
February	.31	.39	T	.11	.41	.13	.76	.17	.87	.29E	.50	.62	.26	1.01	.82	.16	.45	1.26	.95	.33	.90
March	1.70	.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
April	1.63	2.89	.63	1.27	2.56	1.50	.70	.90	2.72	1.40	.77	.27	1.00	2.77	0	.56	.24	.53	.72	1.07	2.96
May	2.04	.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*	4.35	1.40
June	3.81	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
July	3.71	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
August	3.30	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
September	.99	.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
October	1.17	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*
November	.62E	.70	1.06	.30	1.21	.29	.38	.67	.15	.20	T	2.27	.98	1.02	.94	.90	.46	.66	.10	1.68*	1.97
December	1.70E	1.76E	.21	.73	.37	.50E	.32	.75	1.40	.65E	.37	.26	.79	.16	.18	.99	.57	.10	1.02	.38	.36*
Total	21.54	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
Departure from normal	+1.82	-.56	+10.26	+4.59	+5.56	-.70	-.62	+1.68	+5.43	-2.94	-5.16	-1.55	+0.35	-3.53	-1.84	+2.61	-.78	+86	-3.21	+5.06	-0.61
Kentucky bluegrass seed yields**			650	448	673	492	405	422	642	504	146	140	507	415	62	625	595	605	613	525	488

* E = estimated rainfall.

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

+ Roseau data missing - This is Harrold reading.

1986 Kentucky Bluegrass Studies

Data from 4 separate Kentucky bluegrass strain trials are reported this year. Seed yields in the 1982 and 1985 trials were fair to good but the two 1983 seedings had quite low yields. Grower yields for 1986 were generally average or above where a good fall burn took place in 1985.

Powdery mildew was observed again in 1986 on susceptible varieties. As has been the case in the past, newly seeded varieties proved to be the most susceptible to mildew and loss of yield seemed to be suffered by some strains. There is a significant correlation in the 1985 seeding between mildew ratings on June 2, 1986 and seed yield on Table 4. This seeding will be maintained in 1987.

The 1982 Kentucky bluegrass trial has mildew on only the most susceptible varieties but it is interesting to note that the plots treated with Parlay at 0.5 lb a.i./A in October 1984 showed no mildew symptoms. Three other observations can be made about the Parlay treated plots: 1) Reduced lodging on varieties with this tendency. 2) Yield increases on 70% of the plots and 8% remained the same. 3) Effects in 1986 were less apparent than in 1985 and may not show up at all with a lower rate.

We made a fall application of Parlay at 0.2 lb a.i./A on the Steve Dahl farm two miles south of Roseau in 1986. This was on a new seeding of Park Kentucky bluegrass and it will be interesting to follow up on this area in 1987.

Table 1. Mildew, lodging, plant height, harvest dates, and seed yields for Kentucky bluegrass strains seeded in 1982 on Baumgartner (Welin) Farm, Roseau, MN. 1984 and 1985 seed yields included.

Strain	MSP No.	Mildew* (6-4)		Lodging** (7-8)		Plant height† (7-8)		Harvest date		Seed Yields (lb/A)						
		T	NT	T	NT	T	NT	T	NT	Estimated		1984				
		T	NT	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT	
Adelphi	2063	0	0	1.0	1.0	72	70					383	300	214	134	205
America	1695	0	0	1.0	1.0	50	53					333	250	270	261	413
Aspen	2064	0	0	1.0	1.0	58	60	7-3	7-4					336	250	270
Balin	2137	0	0	1.0	3.7	82	83					433	400	478	342	267
Baron	1936	0	0	1.0	1.0	40	48	7-4	7-1					401	401	508
BAR Pp-81-E	2044	0	0	1.0	1.0	42	48					233	300	202	285	469
Bel. 20	1930	0	T	1.0	1.5	60	68					400	425	249	199	321
Bel. 21	1931	0	0	1.0	1.0	68	72					317	267	169	107	211
Bel. 22	1932	0	0	2.5	7.0	53	60					325	250	392	285	229
Bristol	1767	0	0	1.0	1.0	50	62					383	250	238	157	434
Camilla	2138	0	0	1.0	1.0	37	43					58	50	42	27	98
Charlotte	2139	0	0	1.0	1.3	33	40					33	27	30	18	39
Cynthia	2015	0	0	1.0	1.0	45	52					350	400	229	330	416
Eclipse	1740	0	0	1.0	1.3	55	60					217	233	113	86	401
Emmundi	2051	0	T	1.0	1.0	50	52					100	123	39	27	312
Enprima	2052	0	0	1.0	1.0	45	50					233	200	199	235	377
Entopper	2053	0	0	1.0	1.0	58	60					600	600	131	187	315
Erte	2140	0	0	1.0	2.7	70	68					333	283	303	285	199
Escort	1571	0	0	1.0	1.3	63	70					283	200	211	122	404
Granada	2065	0	0	1.0	1.3	55	60					190	160	160	149	217
Harmony	1992	0	0	1.0	1.0	42	50					417	433	451	359	454
Holiday	1752	0	0	1.0	1.0	58	60					150	63	143	80	181
Julia	2054	0	T	1.3	2.7	68	68					233	133	181	71	294
Kimono	1280	0	0	1.0	1.0	40	48					123	87	125	98	294
Kyosti	2100	0	0	1.0	1.0	50	53					50	53	149	199	187
Leikra	2050	0	0	1.7	5.3	87	87					400	350	377	288	241
Melba	1934	0	0	1.0	1.0	33	38					350	300	42	50	413
Mer Pp-43	1948	0	0	1.0	1.3	58	62					383	400	137	116	226

Table 1. Continued.

Strain	MSP No.	Mildew* (6-4)		Lodging** (7-8)		Plant height† (7-8)		Harvest date		Estimated		1986		1985		1984	
		T	NT	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT
		T	NT	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT
Monopoly	1711	0	0	1.0	4.0	73	68	7-4	7-2	513	482	324	273	386			
Mosa	1548	0	T	1.0	1.0	45	50	7-4	7-4	682	571	288	229	270			
Mystic	1937	0	0	2.7	6.3	58	63			417	350	134	163	267			
Parade	2066	0	0	1.0	1.7	63	70	6-30	6-30	645	485	279	276	454			
Park	1461	0	T	1.0	2.3	70	72	6-30	6-30	574	488	463	368	380			
Plush	1753	0	0	1.0	1.0	70	72			567	533	211	137	249			
Prato	2067	0	0	1.3	4.3	83	82			450	417	345	264	264			
P.O. 3132	1978	0	0	1.0	1.3	47	53			233	150	53	30	247			
P.O. 3232	1979	0	0	1.0	1.3	50	52			200	150	77	42	249			
P.O. 3332	1980	0	0	1.0	1.7	50	57			200	183	53	30	276			
P.O. 3432	1981	0	0	1.0	1.3	42	50			150	80	169	86	457			
P.O. 30232	1977	0	0	1.0	1.0	38	42			207	150	119	116	345			
Ram I	1938	0	0	1.0	1.0	43	48			175	100	45	74	211			
Rugby	2068	0	T	1.0	1.3	55	62	7-2	7-2	494	390	395	220	463			
Sophia	2141	0	0	1.0	1.0	47	54			267	310	118	141	394			
Trampas	1935	0	0	1.0	1.3	47	53			517	417	107	154	576			
Trenton	2069	0	T	1.0	1.5	65	70	7-4	7-4	491	401	389	321	446			
Welcome	1993	0	0	1.0	1.3	45	47			67	60	184	86	172			
243	1939	0	0	1.0	1.0	53	60			367	367	232	279	410			
NK-Exp K1-138	2070	0	0	1.0	1.0	38	45			367	417	339	443	561			
K1-152-7	2071	0	0	1.3	4.0	58	68			383	400	241	160	345			
K1-160-5	2072	0	0	1.0	1.3	72	70			300	250	288	321	273			
K3-157-5	2073	0	0	1.0	1.0	78	78			333	333	128	131	270			
K3-160-6	2074	0	0	1.0	1.0	68	72			383	383	71	107	226			
K3-162-5	2075	0	0	5.7	6.3	65	67			250	183	244	146	98			
K3-166	2076	0	0	1.0	3.0	65	70			400	433	339	235	377			
K3-174-3	2077	0	0	1.0	2.7	73	73			317	283	282	247	291			
K3-178	2078	0	T	1.0	1.0	70	73			350	450	330	347	315			

Table 1. Continued.

Strain	MSP No.	Mildew* (6-4)		Lodging** (7-8)		Plant height† (7-8)		Harvest date		Seed Yields (lb/A)									
		T	NT	T	NT	T	NT	T	NT	Estimated		1986		1985		1984			
		T	NT	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT
NK-Exp.																			
K3-179-5	2079	0	0.8	1.0	1.7	70	72	7-1	6-30	378	220	95	146	169					
K3-180-1	2080	0	0	1.0	2.3	68	73			350	275	119	160	282					
K3-187-2	2081	0	0	1.0	1.0	65	73			350	275	383	208	327					
K3-222-2	2082	0	0	1.0	1.0	68	70			367	333	169	166	205					
K6-32-2	2083	0	0	1.0	2.0	63	70			433	450	419	303	413					
K6-80-1	2084	0	0.5	1.0	1.5	90	85	6-30	6-30	486	501	570	303	184					
K6-87-1	2085	0	0	1.7	4.3	72	73			383	350	460	368	330					
N6-106	1588	0	0	1.0	3.7	70	68	6-30	6-30	363	321	407	309	288					
K0-140	1587	0	0	1.7	5.7	70	70	6-30	6-30	642	497	647	517	454					

* 0 = no mildew, 5 = severe infection.

** 1 = no lodging, 9 = severely lodged.

† 2.5cm = 1 inch.

‡ T = treated with 0.5 lb/ai/A Parlay, October, 1984; NT = not treated with Parlay.

LSD at 5% level
1% level

152 135
199 178

Table 2. Percent heading, mildew readings, plant height, lodging, harvest dates and seed yields for Kentucky bluegrass varieties seeded in 1983 on the Baumgartner (Welin) Farm, Roseau, MN.

Variety	MSP No.	Percent heading		Mildew*		Plant height**		Lodging† 7-10	Harvest date	Seed yields (lb/A)		
		5-26	6-2	6-2	6-6	7-9	7-9			1985	1986	2-yr Avg.
Adelphi	2238	0	4	2.3	3.0	70	70	1.7	7-8	271	86	179
Admiral	2239	0	4	1.2	T	62	62	1.7	7-4	416	208	312
America	2240	0	1	0.3	0	57	57	1.0	7-8	452	366	409
Ampellia	2143	0	1	0	0	70	70	3.3	7-7	285	95	190
Apart	2241	1	4	0	0	53	53	1.7	7-3	161	119	140
Aporl	2217	0	3	0	0	57	57	1.0	7-3	104	86	95
Aquila	1915	0	1	0	0	50	50	2.0	7-7	268	68	168
Argyle	2242	4	18	1.4	T	67	67	2.3	7-3	443	143	293
Aspen	2243	0	4	0.8	T	65	65	2.3	7-8	529	244	387
A-20	2244	0	T	0.7	T	67	67	1.7	7-8	178	21	100
A-20-6	2245	0	3	0	T	55	55	1.0	7-8	122	62	92
A-20-6-A	2246	0	3	1.8	T	73	73	2.7	7-6	285	110	198
A-34	2247	1	7	0.3	1.0	68	68	2.7	7-6	318	116	217
BH 61-91	2248	0	1	2.0	1.3	57	57	1.0	7-8	755	205	480
Banff	2249	0	3	2.5	1.3	70	70	1.7	7-5	473	274	374
Baron	2250	0	2	2.1	T	52	52	1.0	7-8	791	262	527
Bartissimo	1675	0	0	0.3	0	62	62	2.7	7-9	330	146	238
Bayside	2251	1	8	0	0	80	80	2.0	7-3	375	101	238
Birka	2252	0	2	0.3	0	53	53	2.0	7-6	98	172	135
Bonnie blue	2253	0	5	3.6	1.5	55	55	3.0	7-6	181	158	170
Bono	2254	0	1	0.3	0	58	58	1.3	7-8	59	125	92
Bristol	2255	0	4	0	0	60	60	1.7	7-8	494	262	378
Cello	2256	0	1	0	0	60	60	1.7	7-8	172	184	178
Charlotte	2257	0	T	1.0	1.0	42	42	1.7	7-7	83	27	55
Cheri	2258	0	2	0	T	62	62	1.0	7-8	607	297	452

Table 2. Continued.

Variety	MSP No.	Percent heading		Mildew*		Plant height**		Lodging† 7-10	Harvest date	Seed yields (lb/A)	
		5-26	6-2	6-2	6-6	7-9	7-9			1985	1986
CEB VB 3965	2259	0	3	0	0	52	1.0	7-8	62	253	158
Claudia	1545	0	5	2.3	1.0	60	1.7	7-6	268	178	223
Columbia	2260	0	4	2.5	1.0	65	2.7	7-7	366	152	259
Dormie	2261	1	5	0.3	0	62	1.7	7-5	633	256	445
Eclipse	2262	1	2	0	T	57	1.3	7-6	467	235	351
Enmundi	2263	0	1	2.5	1.0	53	1.0	7-8	372	122	247
Enoble	2264	1	8	3.4	T	57	2.7	7-8	282	277	280
Escort	2265	0	7	0	T	75	5.7	7-6	178	113	146
Fylking	2266	0	3	0.3	T	42	2.7	7-8	95	51	73
Geronimo	2267	0	5	3.9	2.5	67	3.3	7-3	508	205	357
Glade	2268	0	1	1.8	T	55	1.3	7-8	300	122	211
Harmony	2269	0	4	0	0	57	1.0	7-8	526	470	498
Holiday	2270	0	2	1.4	T	62	1.0	7-5	282	137	210
H-7	2318	0	2	1.0	T	67	2.7	7-6	196	92	144
ISI 128	1693	0	4	0.3	T	63	1.0	7-5	440	279	360
I-13	2271	0	3	2.9	2.0	58	2.7	7-8	143	68	106
Kenblue	2272	5	22	2.0	1.0	75	2.7	7-3	416	193	305
Kimono	2273	0	1	2.8	1.3	45	2.3	7-7	285	131	208
KO-140	1587	7	22	0.3	T	58	4.7	7-3	520	128	324
KI-152	2274	0	3	1.3	1.0	68	1.0	7-7	446	119	283
K3-157	1812	1	7	1.1	0	78	1.0	7-4	390	181	286
K3-160	1813	0	5	1.3	T	73	1.7	7-3	363	140	252
K3-162	2275	4	17	0	0	62	6.0	7-4	244	116	180
K3-178	2276	1	5	2.1	2.3	67	1.3	7-7	505	169	337
K3-179	2277	1	4	4.0	4.0	63	2.0	7-8	169	62	116
K6-80	1817	5	20	4.1	3.3	78	1.0	7-3	390	116	253
Lovegreen	2319	0	3	0.8	0	52	1.3	7-8	155	321	238
Majestic	2278	0	3	0.3	1.0	53	1.3	7-8	256	175	216
Mer.Pp-43	2279	T	8	1.8	1.0	58	1.3	7-6	202	211	207
Mer.Pp-300	2280	0	4	2.0	1.0	55	1.7	7-8	746	184	465

Table 2. Continued.

Variety	MSP No.	Percent heading		Mildew*		Plant height**		Lodging†	Harvest date	Seed yields (lb/A)	
		5-26	6-2	6-2	6-6	7-9	7-10			1985	1986
Merion	2281	T	5	1.3	1.3	72	2.0	7-5	369	175	272
Merit	2282	0	2	0.7	1.0	57	1.0	7-7	1011	306	659
Midnight	2317	0	1	2.1	T	52	1.3	7-8	654	259	457
Mireille	1754	0	5	2.8	1.8	45	1.0	7-8	86	146	116
MLM-18011	2283	0	2	2.4	1.0	63	1.0	7-9	494	214	354
Mom Pp 1417	1543	0	3	0	T	55	1.0	7-8	488	232	360
Mom Pp 1765	1544	0	2	0	0	63	1.0	7-8	779	306	543
Mona	2284	0	2	2.0	2.0	68	1.0	7-8	455	134	295
Monopoly	2285	T	7	0	0	73	2.3	7-6	294	202	248
Mosa	2286	0	3	1.8	2.5	57	1.0	7-8	413	229	321
Mystic	2287	0	7	0	0	60	4.0	7-4	467	190	329
Nassau (243)	2316	0	5	1.3	T	65	1.0	7-4	717	330	524
Newport	2331	T	7	2.9	2.0	72	1.0	7-6	651	250	451
Nugget	2288	0	3	0	0	45	1.0	7-8	598	232	415
N6-106	1588	6	18	0	0	65	5.0	7-4	330	54	192
N-535 (Challenger)	2289	0	3	3.0	2.3	62	1.0	7-8	580	235	408
NJ-735	2290	T	5	0	T	65	1.7	7-6	187	140	164
Parade	2291	T	9	1.1	T	62	2.0	7-4	491	155	323
Park	1461	2	15	0	0	68	3.0	7-3	553	167	360
Piedmont	2292	2	13	2.2	T	67	1.7	7-3	413	107	260
Plush	2293	T	7	0	0	70	1.0	7-6	363	107	235
PSU-150	2294	2	10	0	0	70	4.0	7-7	223	104	164
PSU-173	2295	T	8	0	0	78	1.3	7-6	205	161	183
PSU-190	2296	T	7	0.3	0	63	2.0	7-6	253	238	246
Ram I	2297	0	2	0	0	48	1.7	7-8	265	137	201
Rugby	2298	0	3	2.1	1.5	63	1.7	7-6	345	161	253
Saskia	2184	0	2	2.2	0	48	1.7	7-3	844	369	607
S.D. Common	2299	T	15	3.1	1.0	70	4.0	7-3	624	119	372
S-21	2300	T	13	0.7	T	67	2.3	7-6	520	113	317
Shasta	2301	T	5	1.0	0	62	1.0	7-7	363	95	229

Table 2. Continued.

Variety	MSP No.	Percent heading		Mildew*		Plant height** 7-9	Lodging† 7-10	Harvest date	Seed yields (lb/A)		
		5-26	6-2	6-2	6-6				1985	1986	2-yr Avg.
Sophia	2141	0	3	0.7	T	53	1.3	7-8	502	205	354
SV-01617	2302	0	2	0.7	T	42	1.0	7-8	107	48	78
Sydsport	2303	0	1	0	0	63	2.3	7-9	419	134	277
Touchdown	2304	0	7	0.3	0	72	3.0	7-7	101	83	92
Trenton	2305	0	4	1.8	1.0	65	1.3	7-8	449	155	302
Vanessa	2306	0	3	1.4	2.0	60	1.7	7-8	437	244	341
Vantage	2307	T	13	0.3	T	78	4.0	7-3	479	152	316
Victoria	2308	0	1	0	1.5	58	1.0	7-6	874	434	654
Wabash	2309	0	4	0.7	T	73	1.0	7-6	262	65	164
Welcome	2310	0	3	0	0	43	2.3	7-6	15	39	27
WW AG-463	2311	0	4	1.3	1.0	68	1.7	7-7	395	134	265
WW AG-478	2312	0	1	2.1	2.0	37	1.0	7-10	312	167	240
WW AG-480	2313	0	1	0	0	62	1.3	7-8	485	161	323
225	2314	0	4	1.8	1.0	68	1.3	7-5	550	250	400
239	2315	0	5	1.7	T	68	1.3	7-6	407	205	306

* Mildew, 0 = no symptoms; 5 = severe infection.

** 2.5 cm = 1 inch

† 1 = erect; 9 = severely lodged

LSD at 5% level 124 113

LSD at 1% level 163 NS

Table 3. Percent heading, mildew readings, plant height, lodging, harvest dates, and seed yields for Kentucky bluegrass strains seeded in 1983 on the Baumgartner Farm, Roseau, MN.

Strain	MSP No.	Percent heading		Mildew*		Plant height (cm)**		Lodging†	Harvest date	Seed yields (lb/A)		
		5-22	5-26	6-2	6-2	7-9	7-10			1985	1986	2 yr. Avg.
America	2229	0	0	0	2	0	65	2.0	7-8	359	178	269
Ampellia	2143	0	0	0	4	0	62	4.0	7-5	226	134	180
Aporl	2217	0	T	0.3	5	0.3	60	2.3	7-5	149	164	157
Baron	2178	0	T	2.1	2	2.1	50	1.0	7-8	517	235	376
Bel. 20	1930	0	T	2.8	4	2.8	67	3.7	7-7	261	125	193
Bel. 21	1931	T	4	1.0	10	1.0	72	3.0	7-5	175	101	138
Banff	2230	0	0	3.1	4	3.1	65	3.7	7-7	359	167	263
Balin	2137	2	10	0.5	17	0.5	70	7.0	7-4	205	217	211
Camilla	2138	0	0	T	T	T	43	1.7	7-5	59	68	64
Charlotte	2139	0	0	1.0	T	1.0	47	2.0	7-7	104	51	78
Enmundi	2218	0	T	3.4	2	3.4	58	2.7	7-7	285	134	210
Entopper	2219	0	0	0	3	0	65	1.3	7-8	380	294	337
Erte	2140	T	5	3.1	20	3.1	65	6.3	7-4	202	98	150
Escort	2163	0	T	0.7	10	0.7	67	6.0	7-5	119	86	103
EVB-8268	2220	0	0	0	5	0	67	1.3	7-8	475	274	375
Georgetown	2179	0	0	3.1	4	3.1	68	3.3	7-8	294	131	213
Geronimo	2267	0	0	4.2	8	4.2	65	3.0	7-7	160	95	128
Holiday	1752	0	0	1.0	T	1.0	60	2.3	7-5	119	51	85
Kimono	1280	0	0	4.1	T	4.1	50	3.3	7-7	39	51	45
Leikra	2050	T	7	0	20	0	83	4.3	7-4	223	125	174
Mer Pp-43	1948	0	2	2.5	10	2.5	55	2.0	7-5	131	205	168
Mom Pp-2672	2182	0	0	0	T	0	70	1.0	7-8	362	291	327
Mom Pp-3123	2183	0	T	0.7	3	0.7	53	2.0	7-7	125	77	101
Monopoly	1711	0	T	0	10	0	67	7.0	7-7	190	223	207
Mosa	2286	0	0	3.1	T	3.1	58	1.7	7-8	217	152	185
Nassau	2180	0	0	2.8	5	2.8	62	1.7	7-5	454	291	373
Pp-133	2144	0	0	2.9	T	2.9	48	2.3	7-8	490	152	321
Parade	1916	0	2	2.5	15	2.5	67	4.7	7-4	270	119	195

Table 3. Continued.

Strain	MSP No.	Percent heading		Mildew*		Plant height (cm)**		Lodging† 7-10	Harvest date	Seed yields (lb/A)	
		5-22	5-26	6-2	6-2	7-9	7-9			1985	1986
Park	1461	0	T	17	2.0	65	6.7	7-4	425	104	265
Plush	1753	0	T	8	0.7	67	4.3	7-4	202	152	177
Ram I	2181	0	0	T	0	57	1.7	7-7	163	92	128
Rugby	2298	0	0	4	3.3	63	3.0	7-8	249	101	175
Saskia	2184	0	0	4	3.4	47	2.3	7-5	413	241	327
Touchdown	2231	0	2	8	1.7	72	5.3	7-7	53	124	89
Vanessa	1549	0	0	3	3.1	63	1.0	7-8	315	318	317
ZW. 42-94	2158	0	0	2	0	62	1.7	7-8	53	155	104
ZW. 42-96	2159	0	0	5	0	70	1.7	7-8	451	265	358
ZW. 42-102	2160	0	T	10	0	72	5.3	7-7	149	56	103
ZW. 42-103	2161	0	T	15	2.4	80	5.7	7-4	86	113	100
ZW. 42-108	2162	0	0	2	0.3	60	1.7	7-8	119	220	170
								LSD at 5% level -	114	105	
								1% level -	151	NS	

* 0 = no mildew; 5 = severe infection.

** 2.5 cm = 1 inch

+ 1 = no lodging; 9 = severe lodging

Table 4. Percent heading, mildew reading, plant height, harvest date and seed yields for 24 Kentucky bluegrass strains seeded in 1985 on Baumgartner (Welin) farm, Roseau, MN. All data collected in 1986.

Strain	MSP no.	Percent heading			Mildew*			Plant height (cm)** 7-10	Harvest date	Seed yield (lb/A)
		5-22	5-26	6-2	5-7	5-22	6-2			
Aquila	1915	0	0	12	0	0	0	50	7-7	244
Aspen	1039	0	0	8	0	0	1.1	62	7-7	202
BA69-82	2368	0	0	8	0	0	0	60	7-8	285
BA70-131	2369	0	0	7	0	0	0	55	7-8	157
BA72-500	2370	0	0	8	0	0	0	60	7-8	312
BA72-503	2371	0	0	8	0	0	0	62	7-7	244
Banff	2230	0	0	13	2.3	3.7	3.9	57	7-7	71
Baron	2178	0	0	4	0.7	2.0	1.7	47	7-8	223
Dormie	1303	0	2	18	0	0	0	73	6-28	692
Holiday	1752	0	0	10	0.3	0	0.5	63	7-7	107
KO-140	1587	2	12	20	0	0.3	0.1	65	6-28	303
K3-160	2378	0	0	13	0	0	1.1	72	7-7	140
K3-178	1815	0	T	10	3.1	3.7	2.4	55	7-7	74
K6-80	1817	T	7	15	2.3	4.3	4.6	53	7-7	27
Kimono	1280	0	0	5	0	1.0	2.1	48	7-9	175
MompP 2672	2182	0	0	4	0	0	0	60	7-9	252
Monopoly	1711	0	0	15	0	0	0	63	7-7	137
N6-106	1588	T	10	20	0	0	0.4	70	6-28	493
Newport	2372	0	T	15	0	0	1.8	67	6-28	398
Park	2357	0	2	20	0	1.0	1.0	70	7-7	151
Parade	1916	0	T	15	0.7	2.2	2.1	67	7-7	113
Plush	1753	T	4	17	0	0	0.8	63	7-7	175
Rugby	1738	0	T	7	2.7	3.4	4.0	53	7-7	98
Trenton	1810	0	0	8	2.4	3.0	4.1	53	7-8	74

LSD at 5% level = 98
1% level = 131

* 0 = no mildew; 5 = severe infection
** 2.5 cm = 1 inch

1985 Timothy Studies

Performance of Timothy strains from three separate seedings are reported in Tables 5, 6, and 7. The seed yields in the 1983 planting are generally low but the 1984 and 1985 plantings are good. The later maturing varieties, however, e.g. Heidemij, produced few heads and poor seed yields. We have not seen this in the past and do not know why this happened.

Some of the very early new starins produced very good yields. Examples of these are Kunpu, Mom Phl-21, -28, -32, -62, and -63. The 1984 and 1985 plantings have been maintained for 1987.

Table 5. Percent heading, plant height, harvest dates, and seed yields for Timothy strains seeded in 1983 on the Baumgartner (Welin) Farm, Roseau, MN.

Strain	MSP No.	Percent heading			Plant height (cm)* 8-11	Harvest date	Seed yields (lb/A)			3-yr average
		6-3	6-6	6-13			1984	1985	1986	
Early maturing strains										
Climax	1743	0	0	3	118	8-4	309	579	169	352
Extremo	2197	4	7	27	110	7-28	172	505	386	354
FFR Syn. W	2211	0	0	7	122	8-3	285	612	362	420
FFR Syn. Y	2212	0	0	5	110	8-4	309	567	247	374
Mohawk	2209	0	0	2	113	8-1	288	472	238	333
Mom Ph1-21	2321	0	2	17	105	7-29	104	404	196	235
Mom Ph1-28	2322	T	3	17	97	7-28	104	431	125	220
Mom Ph1-30	2323	T	3	20	105	7-28	86	398	166	217
Mom Ph1-32	2324	4	7	25	95	7-23	163	499	226	296
Mom Ph1-56	2325	T	2	20	107	7-28	238	695	300	411
Mom Ph1-59	2326	T	4	17	102	7-28	217	437	312	322
Mom Ph1-62	2327	4	7	25	100	7-21	160	416	306	294
Mom Ph1-63	2328	4	7	25	95	7-28	184	407	151	247
Mom Ph1-64	2329	0	T	15	105	7-31	362	639	303	435
Mom Ph1-69	2330	0	T	20	108	7-28	184	431	297	304
Nosappu	1593	0	0	5	117	8-1	356	722	327	468
Php-9	2146	0	0	8	100	8-1	339	552	267	386
Php-12	2147	0	0	12	100	8-3	241	561	291	364
Richmond	2232	T	T	15	112	7-28	110	532	312	318
SB-HK /	2206	0	0	5	95	8-5	110	347	125	194
Senpoku	1703	0	0	10	107	7-29	347	680	238	422
SV-0906	1892	0	T	12	102	8-4	469	689	312	490
SV-0907	2089	0	0	5	112	8-4	428	618	285	444
SV-0908	2090	0	0	4	107	8-6	413	668	261	447

Table 5. Continued.

Strain	MSP No.	Percent heading			Plant height (cm)* 8-11	Harvest date	Seed yields (lb/A)				3-yr average
		6-3	6-6	6-13			1984	1985	1986	1987	
SV-0909	1894	0	T	10	108	8-1	603	713	350	555	
SV-0910	2091	0	0	8	100	8-3	520	745	330	532	
SV-0914	2092	0	0	5	95	8-3	416	615	303	445	
SV-0916	2093	0	0	T	98	8-6	428	523	211	387	
Tirom	2130	0	T	12	103	7-29	232	535	267	345	
Toro x Clair	1864	T	3	20	112	7-26	131	546	255	311	
<u>Intermediate maturing strains</u>											
FFR Syn. S	2210	0	0	T	103	8-6	469	561	229	420	
Goliath	2198	0	0	2	97	8-6	448	603	202	418	
K4-216	2142	0	0	T	115	8-6	267	425	196	296	
Marpessa	2150	0	0	7	95	8-4	499	841	223	521	
Melora	2151	0	0	0	90	8-9	359	416	113	296	
Php 14	2148	0	0	T	98	8-6	416	630	208	418	
<u>Late maturing strains</u>											
Parol	2145	0	0	0	93	8-19	422	350	157	310	
Heidemij	1744	0	0	0	83	8-19	401	567	53	340	
Hokushu	1511	0	0	0	90	8-19	466	523	143	377	
Intenso	2149	0	0	0	93	8-19	205	288	36	176	
						LSD at 5% level =	156	NS	110		
						1% level =	207	NS	146		

* 2.5 cm = 1 inch

Table 6. Percent heading, plant height, harvest date and seed yields for Timothy varieties seeded in 1984 on the Baumgartner Farm (Welin) Farm, Roseau, MN.

Strain	MSP no.	Percent heading			Plant height (cm)* 8-12	Harvest date	Seed yields (lb/A)		
		6-2	6-6	6-13			1985	1986	2-yr average
Early maturing strains									
Climax	1743	0	0	7	125	8-1	538	339	439
Deploy	2343	2	3	15	108	7-30	324	523	424
Extremo	2197	5	10	25	115	7-25	523	523	523
FFR-Syn. W	2211	0	0	10	118	8-1	514	443	479
Kunpu	2358	12	17	40	117	7-18	359	451	405
Mohawk	2209	0	T	9	117	8-1	446	425	436
Mom Phl 21	2321	8	12	28	112	7-21	499	508	504
Mom Phl 28	2322	8	8	28	117	7-21	404	448	426
Mom Phl 30	2323	7	8	27	108	7-21	244	374	309
Mom Phl 32	2324	10	12	32	108	7-19	437	508	473
Mom Phl 56	2325	2	5	22	122	7-25	701	740	721
Mom Phl 59	2326	5	8	25	110	7-27	392	434	413
Mom Phl 62	2327	7	10	25	107	7-19	309	517	413
Mom Phl 63	2328	10	12	27	93	7-18	327	457	392
Mom Phl 64	2329	T	4	18	110	7-28	357	609	483
Mom Phl 69	2330	2	5	23	120	7-25	374	582	478
Nosappu	1593	0	0	8	120	8-1	745	466	606
Phn 1142	2349	0	0	7	110	7-30	576	653	615
Richmond	2232	T	3	15	122	7-25	591	481	536
SV-0906	1892	0	T	15	105	7-30	671	719	695
SV-0907	2089	0	T	8	113	8-1	743	505	624
SV-0908	2090	0	0	8	107	7-30	555	514	535
SV-0909	1894	0	T	12	102	7-30	520	627	574
SV-0910	2091	T	2	15	107	7-30	633	546	590
SV-0914	2092	0	0	8	112	8-4	621	508	565
SV-0916	2093	0	0	4	113	8-2	484	395	440
Intermediate maturing strains									
Bero	2342	T	2	15	118	8-2	487	419	453
ChAMPLAIN	1745	0	0	T	130	8-12	342	193	268
FFR-Syn. S	2210	0	0	3	122	8-4	484	383	434
FFR-Syn. Y	2212	0	0	8	115	8-1	493	425	459
Goliath	2014	0	0	7	100	8-1	472	416	444
K4-216	2142	0	0	3	123	8-4	487	347	417
Phn 962	2347	0	0	7	112	8-2	600	359	480
Phn 1042	2348	0	T	12	112	8-4	490	380	435
Tiiti	1704	0	0	5	97	8-7	591	226	409

Table 6. Continued.

Strain	MSP no.	Percent heading			Plant height (cm)* 8-12	Harvest date	Seed yields (lb/A)		
		6-2	6-6	6-13			1985	1986	2-yr average
<u>Late maturing strains</u>									
Heidemij	1744	0	0	0	85	8-19	428	65	247
Hokushu	1511	0	0	0	108	8-12	288	208	248
Nobis	2344	0	0	7	72	8-12	86	77	82
Phn 242	2345	0	0	T	60	8-19	187	92	140
Phn 342	2346	0	0	4	60	8-19	250	65	158
LSD at 5% level =							202	153	
1% level =							NS	202	

* 2.5 cm = 1 inch

Table 7. Percent heading, plant height, harvest dates and seed yields for Timothy strains seeded in 1985 on Baumgartner (Welin) Farm, Roseau, MN.

Strain	MSP no.	Percent heading			Plant height (cm)* 8-11	Harvest date	Seed yields(lb/A)
		6-2	6-6	6-13			
<u>Early maturing strains</u>							
Clair	1863	T	5	30	122	7-21	404
Climax	1743	0	0	5	120	8-2	555
Kampe II	1699	T	T	23	113	8-1	437
Kunpu	2358	5	10	40	115	7-18	466
M-11	2373	0	0	18	127	7-31	478
M-22	2374	0	0	18	127	7-30	591
Mohawk	2209	0	T	17	122	7-31	446
Mom Phl 21	2321	2	7	32	108	7-21	487
28	2322	T	5	37	113	7-21	404
30	2323	T	5	28	110	7-25	422
32	2324	7	12	38	108	7-18	686
56	2325	2	7	33	115	7-27	588
59	2326	2	7	35	115	7-28	523
62	2327	5	10	38	108	7-18	627
63	2328	7	10	40	103	7-18	624
64	2329	0	3	23	112	7-30	639
69	2330	T	5	35	122	7-25	671
Nosappu	1593	0	T	18	123	7-30	544
SV-0906	1892	0	T	22	117	8-1	582
SV-0907	2089	0	0	13	118	8-1	546
SV-0908	2090	0	T	15	112	8-2	463
SV-0909	1894	0	T	18	113	8-2	469
SV-0910	2091	0	T	22	113	7-30	612
SV-0914	2092	0	T	13	112	8-2	496
SV-0916	2093	0	0	10	110	8-2	478
Timfor	992	0	0	13	125	7-30	549
<u>Intermediate maturing strains</u>							
Alma	2366	0	T	20	110	8-2	454
Champlain	1745	0	0	T	127	8-11	362
FFR Syn. S	2210	0	0	4	122	8-8	356
Goliath	2014	0	T	15	103	8-2	443
Motim	1702	0	0	2	108	8-8	321
Php-12	2364	0	T	20	110	8-2	472
Php-14	2365	0	0	10	110	8-4	496
WWT-100	2367	0	T	20	110	8-2	621
WW-Tigo	2363	0	0	18	110	8-2	674
Titi	1704	0	0	13	105	8-6	493

Table 7. Continued.

Strain	MSP no.	Percent heading			Plant height (cm)*	Harvest date	Seed yields(lb/A)
		6-2	6-6	6-13	8-11		
<u>Late maturing strains</u>							
Heidemij	1744	0	0	0	75	8-19	30
Hokushu	1511	0	0	0	103	8-11	160
						LSD at 5% level	112
						1% level	149

*2.5cm = 1 inch

1986 Fine Fescue Studies

The 1983 strain trial was the only fine fescue study maintained for 1986. Mommersteeg of Holland had three strains tested that were some of the best seed yielders. These are Mom Frr-205, -232, and -238 with yields of 604, 809, and 541 lb/A, respectively. The remaining yields and other data are reported in Table 8.

The use of the herbicides Poast and Fusilade has shown promise in controlling annual and perennial grasses, particularly quackgrass, in fine fescue. It should be noted that established quackgrass is not killed with these chemicals and an application at least once a year is required for quackgrass free seed production.

Table 8. Percent heading, plant height, lodging, harvest dates and seed yields for Fine Fescue varieties seeded in 1983 on Baumgartner (Welin) Farm, Roseau, MN.

Strain	MSP No.	Percent heading		Plant height (cm)*		Lodging** 7-10	Harvest date	Seed yields (lb/A)		
		5-27	6-3	7-9	7-9			1985	1986	2-yr. avg.
Atlanta	2106	0	10	70	4.7	7-9	128	143	136	
Bellamy	2185	T	17	72	4.0	7-9	279	223	251	
Biljart	2105	8	23	72	2.7	7-4	374	226	300	
Checker	2170	T	10	70	6.3	7-9	178	300	239	
Eboli	2124	4	22	72	3.0	7-4	175	324	250	
Enzet	2171	0	7	72	6.0	7-9	603	559	581	
Highlight	2062	T	12	70	4.7	7-7	80	253	167	
Jamestown	2104	0	15	73	7.7	7-9	318	601	460	
Lifalla	2216	2	15	70	7.0	7-9	---	155	---	
Longfellow	1609	0	13	72	6.0	7-9	514	354	434	
Mn 6673	1722	0	7	67	8.3	7-9	404	294	349	
Mn 66111	1723	0	5	68	7.7	7-9	333	485	409	
Mn 66136	1726	0	4	67	7.7	7-9	318	485	402	
Mn 66218	1727	0	7	70	7.3	7-9	561	532	547	
Mn 66223	1728	T	8	70	6.7	7-9	472	357	415	
Mn 66233	1729	0	4	65	7.0	7-9	333	333	333	
Mn 66354	1721	T	18	73	6.3	7-9	359	378	369	
Mn 67123	1724	0	4	70	7.3	7-9	235	401	318	
Mn 67135	1725	4	25	80	2.7	7-7	440	345	393	
Mom Frc-12	1284	T	17	70	4.7	7-9	92	291	192	
Mom Frc-38	2133	T	20	70	5.3	7-9	---	309	---	
Mom Frc-61	1639	T	15	72	4.0	7-9	229	342	286	
Mom Frc-205	2186	T	8	68	8.7	7-9	223	604	414	
Mom Frc-232	2187	0	7	70	7.0	7-9	594	809	702	

Table 8. Continued.

Strain	MSP No.	Percent heading		Plant height (cm)*	Lodging**	Harvest date	Seed yields (lb/A)		
		5-27	6-3				7-9	7-10	1985
Mom Fri-238	2188	T	10	70	7.0	7-9	490	541	516
Pennlawn	2109	0	3	68	7.7	7-9	125	202	164
Reliant (FL-1)	1655	8	22	70	2.7	7-6	585	214	400
Ruby	2110	0	10	70	7.3	7-9	89	312	201
ZW 42-100	2152	T	12	67	4.7	7-9	---	205	---
ZW 42-101	2153	T	12	72	4.7	7-9	196	315	256
							LSD at 5% level		
							1% level	227	248

* 2.5cm = 1 inch

** 1 = no lodging, 9 = severe lodging

1986 Reed Canarygrass Studies

The development of the low alkaloid varieties, Palaton and Venture, by Dr. Robert Kalton at Felco Land-O-Lakes, has greatly increased interest in Reed canarygrass. These varieties also have the advantage of some shattering resistance and superior seed production. They have begun to be produced on the upland soils in Northern Minnesota.

We are reporting data on three strain trials and one management trial with Palaton Reed canarygrass. A similar management study was done on Venture Reed canarygrass in 1985. Good response to fertilizer rates of 90+45+45 and 120+60+60 was seen in 1985, but spring flooding of the 1986 study seems to have diminished these results. These high fertilizer rates for Palaton or Venture should pay off in the long run given the varieties' seed yield potential.

Management of the residue is somewhat less clear. The highest yields were obtained with no treatment at all but this is not practical after the first year of production. Removal by baling or possibly burning as soon after harvest as possible seems to be the best alternative. More work could be done in this area.

Table 9. Percent heading, plant height, harvest dates, and seed yields for 8 reed canarygrass varieties seeded in 1983 on the Baumgartner (Welin) farm, Roseau, MN. Seed yields reported for 1985 and 1986.

Strain	MSP No.	Percent heading		Plant height (cm)* 7-10	First harvest date	1985 seed yields			1986 seed yields	
		6-5	6-9			7-8-85	7-13-85	7-19-85	First harvest	Harvest 7-9
Commercial	1251	5	10	163	7-4	241	134	48	336	113
Flare	1983	5	10	165	7-5	336	282	235	330	169
Line 22	2224	7	12	158	7-4	217	154	59	274	89
MN-76	1734	12	18	165	7-4	101	65	56	217	39
Palaton	2199	7	12	150	7-6	665	555	392	461	351
Rise	1853	4	8	165	7-5	389	345	241	428	223
Vantage	1854	5	10	163	7-7	330	276	247	395	333
Venture	2200	7	12	155	7-6	591	416	398	410	312
					LSD at 5% level	88	197	105	107	93
					1% level	122	NS	146	NS	129

* 2.5 cm = 1 inch.

Table 10. Percent heading, plant height, and seed yields for 8 reed canarygrass strains seeded in 1984 on the Baumgartner (Welin) farm, Roseau, MN. Seed yields from 1985 and 1986, percent heading and plant height from 1986 only.

Strain	MSP No.	Percent heading		Plant height (cm)* 7-10	Seed yields (lb/A)				
		6-5	6-9		7-8-85	7-13-85	7-19-85	7-4-86	7-10-86
Flare	1983	0	7	167	570	570	330	416	351
MN-76	1734	T	18	173	327	232	53	175	68
Palaton (PS-3)	1985	0	7	158	820	677	457	580	473
Palaton (PS-3)	2236	0	12	157	763	728	386	562	467
Rise	1853	0	5	168	570	546	244	395	324
Vantage	1854	0	7	167	600	487	247	520	407
Venture (PS-2A)	1984	0	8	160	751	728	353	550	598
Venture (PS-2A)	2200	0	7	158	829	683	410	535	458
					LSD at 5% level	176	128	144	137
					1% level	244	177	199	190

* 2.5 cm = 1 inch.

Table 11. Percent heading, plant height, and seed yields for 8 reed canarygrass strains seeded in 1985 on the Baumgartner (Welin) farm, Roseau, MN.

Strain	MSP No.	Percent headed		Plant height (cm)*	Seed yields (lb/A)	
		6-3	6-9		7-10	Est.**
Mn-76	1734	17	18	167	167	56
NAPB 427901	1851	2	10	160	450	309
NAPB 427902	1852	4	12	160	417	262
Palaton (PS-3)	2199	7	13	147	500	324
Rise	1615	4	12	162	350	190
Vantage	1616	2	10	160	350	238
Venture (PS-2A)	2200	8	12	147	500	232
					LSD at 5% level	43
					1% level	60

* 2.5 cm = 1 inch.

** Harvested 7/7 after much seed had shattered. Estimate of seed production is given to support seed yields.

Table 12. Plant vigor, percent heading, plant height and seed yields recorded in residue and fertilizer management of Palaton reed canarygrass on Gus Kveen Farm, northwest of Roseau, MN. 1985-1986.

Residue regime	Fertilizer	Plant vigor*	Heading**	Plant height (cm)***		Seed yields (lb/A)
				6-5	7-4	
August Clip	60+30+30	5.0	2.7	80	160	558
	90+45+45	4.7	2.7	82	158	494
	120+60+60	3.0	1.7	92	162	627
August Burn	60+30+30	5.7	3.7	80	157	517
	90+45+45	6.0	3.0	77	152	502
	120+60+60	5.3	2.3	80	158	523
September Burn	60+30+30	8.3	4.8	63	147	384
	90+45+45	8.3	5.0	65	138	384
	120+60+60	7.3	4.7	68	147	422
October Burn	60+30+30	5.7	3.0	90	152	497
	90+45+45	6.0	4.3	83	148	458
	120+60+60	5.0	3.7	88	152	485
No Treatment	60+30+30	5.0	2.3	98	160	669
	90+45+45	5.0	2.0	102	168	601
	120+60+60	4.0	1.7	102	170	654

* 1 = best vigor; 9 = least vigor

** 1 = most heading; 5 = least heading

***2.5 cm = 1 inch

1986 Perennial Ryegrass Studies

We seeded 21 perennial ryegrass strains and 3 fescue strains in May 1985 with and without spring wheat as a cover crop. The wheat was removed at maturity leaving a 6-8 inch stubble. The material without wheat was not cut. A similar study was harvested in 1985.

The perennial ryegrass stands in the spring of 1986 were good under wheat stubble. Stands were more variable with no cover crop and in most cases were poor. Seed yields with cover crop were higher in 67% of the strains. Earlier maturity and more even ripening were also observed.

In the 1985 study, 100% winterkill was recorded in plots with no cover crop. The yields were good where strains were seeded under wheat with a few yields exceeding 900 lb/A.

We have found perennial ryegrass to produce a satisfactory seed crop usually only the second year after planting. Winterkill is normally severe after 1 seed crop and we have only harvested a second year in 1979.

Stef and K5-30 tall fescue and Cykade meadow fescue were also included in this study. The results here seem to be the opposite of the perennial ryegrass with percent stands slightly better and seed yields up substantially with no cover crop. Quackgrass needs to be controlled before either fescue or perennial ryegrass can be grown because the seed cannot be separated.

Table 13. Percent stand, plant vigor, percent heading, plant height, harvest date and seed yields for perennial ryegrass and fescue strains seeded in 1985 on the Baumgartner (Welin) Farm, Roseau, MN. All 1986 data.

Strains	MSP no.	Percent stand 5/22		Plant vigor†		Percent heading		Plant height (cm)*		Harvest date		Seed yields (lb/A)					
		CC**	NCC**	6-2		6-13		8-11		CC	NCC	CC	NCC				
				CC	NCC	CC	NCC	CC	NCC								
Perennial Ryegrass																	
Acclaim	2011	80	60	2.5	2.0	2.5	3.4	T	T	23	13	73	65	7-13	8-15	397	250
Bastion	2191	80	50	1.5	2.0	3.0	4.0	3	0	30	T	75	70	7-13	8-11	312	205
Belida	2337	80	25	2.0	2.0	2.7	4.2	3	T	30	3	70	75	7-13	8-2	410	236
Bison	2172	70	15	1.5	2.0	2.8	4.7	T	0	15	0	93	90	7-18	8-15	660	268
Citadel	2192	75	30	1.5	2.0	2.5	4.0	0	0	6	0	75	75	8-2	8-15	277	165
Delray	1585	70	60	3.0	3.0	3.3	3.4	2	2	30	25	60	65	7-11	7-16	343	535
LD 2343	1971	75	15	3.0	2.7	4.0	4.2	0	0	0	0	78	80	8-2	8-19	268	326
LD 2344	1972	70	20	2.0	3.2	4.0	4.0	0	0	0	0	75	90	8-6	8-15	388	210
LD 2408	1973	70	25	1.5	3.0	3.7	4.0	0	0	0	0	78	85	8-2	8-19	366	138
LD 2504	2225	70	25	1.0	2.0	3.2	4.5	T	0	28	T	88	83	7-13	8-19	482	268
LD 2508	2226	75	33	1.0	2.0	2.7	3.9	T	0	25	T	83	90	7-13	8-19	531	281
Mom Lp-87	2193	80	40	1.0	2.0	2.5	4.2	T	T	30	6	80	75	7-13	8-11	651	357
Mom Lp-210	2013	75	40	3.0	3.2	3.5	4.0	0	0	3	0	63	68	7-25	8-19	388	268
Mom Lp-736	2194	90	90	3.0	3.0	4.0	3.0	T	0	6	8	60	63	7-18	8-11	419	508
Mom Lp-792	2195	85	20	3.0	3.0	3.7	4.0	0	0	3	0	63	65	7-25	8-15	428	446
Morene	2196	70	50	3.0	3.5	3.9	3.5	0	0	T	T	68	78	7-25	8-15	335	236
NK-200	1584	75	75	3.0	3.0	3.3	2.7	0	0	0	0	75	78	8-2	8-11	589	343
NK-Exp. 79307	1820	80	55	3.3	3.3	3.0	3.7	T	0	20	8	58	53	7-13	8-2	317	558
79308	1821	75	30	3.0	2.5	3.0	4.2	T	T	23	10	63	60	7-13	8-11	504	357
79309	1822	80	70	3.2	3.7	3.7	3.2	T	T	18	15	63	60	7-13	8-2	410	629
Pleno	2341	75	15	2.0	3.2	4.0	4.0	0	0	0	0	68	68	8-2	8-19	272	277
Fescue																	
Cykade	2332	60	90	2.0	2.0	2.7	2.0	5	8	40	35	113	98	7-9	7-9	138	812
K5-30	1824	60	90	2.5	2.5	3.7	1.0	5	10	40	40	113	110	7-9	7-18	120	1137
Stef	2333	60	100	2.5	2.5	3.7	1.0	T	T	15	28	130	140	7-9	7-18	18	1191

+ 1 = best vigor; 5 = least vigor
 * 2.5 cm = 1 inch
 **CC = Seeded under wheat; NCC = Seeded without cover crop