

Progress Report of Seed Production Research

prepared by

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Table I. Monthly precipitation at Roseau, MN 1966-1981, with some average Kentucky bluegrass seed yields from 1968-1981.

Month	Year															
	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
January	.56	1.13E*	.62	3.07	.71	.54	.68	.09	.88	1.10E	1.13	.14	.36	.50	.55	.18
February	.31	.39	T	.11	.41	.13	.76	.17	.87	.29E	.50	.62	.26	1.01	.82	.15
March	1.70	.59	1.25	.05	1.38	.26E	.50E	1.18	.16	.64E	1.05	1.02	.17	1.06	.35	.66
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
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
June	3.81	2.23	6.47	2.29	4.07	2.99	5.03	2.21	1.56	4.96	5.82	3.71	1.92	1.91	1.75	6.85
July	3.71	4.95	6.18	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
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
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
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
November	.62E	.70	1.06	.30	1.21	.29	.38	.65	.15	.20	T	2.27	.98	1.02	.94	.10E
December	1.70E	1.76E	.21	.73	.37	.50E	.32	.75	1.40	.65E	.37	.26	.79	.16	.18	.10E
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	21.81
Departure from normal	+1.82	-.56	+10.26	+4.59	+5.56	-.70	-.62	+1.68	+5.48	-2.94	-5.16	-1.55	+0.35	-3.53	-1.84	0.82
Kentucky bluegrass seed yields***			650	448	673	492	405	422	642	504	146	140	507	415	62	625

* E = estimated rainfall

** NA = not available

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

The Weather at Roseau in 1981

Nearly adequate rainfall during the late summer and fall of 1980, and good rainfall after May 24, 1982 produced good recovery in most of the materials established previously. The fall rains of 1980 totaled over 10 inches for August, September and October. Precipitation during the spring was very sparse until about May 24th, when about two inches fell. We believe this may have been more beneficial to the later Bluegrass varieties than for the earlier ones.

1981 Fall rainfall was nearly 8.00 inches for August, September and October, which seemed to give the plants a good start for 1982 seed production.

Kentucky Bluegrass Data

We are reporting data from 1976, 1977, 1978, 1979 and 1980 seedings. Most yields in the 1976 Variety x Fertilizer x Cultural Study were not satisfactory. Yields in all of the other trials appear to be good, except in the 1980 seeding when we recorded only heading percentages as seed yields would have been very low. The 1981 seed yields from Park Kentucky bluegrass production fields was very good to poor. Generally, older age of stand appears to depress the yields, but does not explain all of the variations. Again in 1981 we noted that varieties react differently to Paraquat desiccation before burning. (Tables 6 and 7).

Table 1. Percent heading, plant height, lodging, harvest date and seed yields for 83 Kentucky bluegrass strains seeded in 1977 on Welin Farm, Roseau, MN (1979, 1980 and 1981 data).

Entry	MSP no.	Percent Heading		Plant Height (cm)		Lodging* 7/11	Harvest date	Seed Yield		Lbs/A 1981	2-yr ave. 79-81 (#'s/A)	
		5/29	6/6	6/16	6/3			7/1	1979			1980/1981 Est.
Arista	628	2	60	77	18	47	1.0	7-14	567	4.3	2.6	564
Adelphi	1205	T	53	70	23	63	2.3	7-14	425	5.0	3.1	434
Aquila	1038	T	33	47	32	58	2.7	7-10	624	4.5	3.8	460
Baron	917	T	30	70	20	60	1.0	7-11	618	4.3	2.2	716
Cheri	1107	0	37	77	20	65	1.0	7-14	404	4.5	1.8	722
Eda	1023	T	60	50	23	50	1.0	7-12	193	5.0	3.7	443
Enmundi	1147	0	23	37	18	58	1.3	7-11	446	5.0	2.8	481
Enoble	1148	T	53	77	25	60	2.3	7-10	425	4.8	2.7	466
Enprima	1207	0	67	87	25	60	2.0	7-11	333	4.8	2.4	460
EVB-5585	1146	0	17	70	28	68	4.0	7-14	247	5.0	3.2	249
Fanfare	1011	0	60	83	32	68	4.0	7-14	270	4.2	2.1	502
Gardi	1106	0	20	53	20	50	1.7	7-16	425	5.0	3.1	374
Geronimo	1218	0	40	80	25	68	2.0	7-9	487	5.0	2.0	829
Granada	1194	T	23	40	30	63	3.0	7-13	318	4.8	3.4	440
Kimono	1219	0	17	37	22	55	1.3	7-11	383	5.0	3.4	484
Monopoly	863	0	37	60	30	63	4.3	7-16	440	5.0	3.1	454
Mosa	1220	0	30	50	27	58	1.7	7-14	431	4.5	2.9	469
Narika	1022	0	70	67	35	67	3.3	7-14	327	4.2	3.0	689
Newport	722	0	57	90	28	70	1.7	7-13	766	3.3	1.2	897
Nugget	916	0	53	50	28	40	1.7	7-14	392	4.5	2.7	549
Olymprisp	1208	0	63	87	28	67	1.7	7-10	704	4.1	1.8	766
Onar	724	0	20	27	28	62	1.3	7-14	431	4.8	3.8	300
Parade	1034	0	53	67	23	65	3.3	7-14	457	4.5	3.2	579



Table 1. (continued)

Entry	MSP no.	Percent Heading		Plant Height (cm)		Lodging* 7/11	Harvest date	Seed Yield		Est. 1980/1981	Lbs/A 1981	2-yr ave. 79-81 (#'s/A)	
		5/29	6/6	6/16	6/3			7/1	Lbs/A 1979				Lbs/A 1980/1981
Park	1209	T	67	67	40	67	4.7	7-10	446	4.1	3.5	410	428
RU-128	1149	0	53	63	23	62	2.0	7-11	523	5.0	3.0	523	523
RU-154	1150	0	18	73	17	62	2.7	7-15	514	4.1	2.2	570	542
RU-178	1151	0	20	63	20	57	1.7	7-14	413	4.3	3.3	318	366
Rugby	1007	0	33	80	25	65	3.3	7-15	410	4.4	2.4	529	470
Skofti	955	0	17	40	13	37	1.3	7-12	270	5.0	3.8	276	273
Tivoli	1105	0	8	27	17	45	1.3	7-16	398	5.0	3.5	205	302
Touchdown	934	0	33	43	25	67	2.3	7-10	149	5.0	3.7	214	182
Trenton	1032	0	60	77	23	67	2.7	7-14	457	4.5	3.0	621	539
Turnier	1031	0	20	33	20	57	1.0	7-15	374	4.4	3.2	475	425
Vanessa	1221	0	12	80	23	63	1.0	7-16	306	4.5	2.4	448	377
Warrens A-20	953	0	22	33	37	65	3.3	7-14	190	4.5	3.7	261	226
Warrens A-34	954	0	17	57	30	68	3.7	7-15	472	5.0	3.5	303	388
WWAG 401	1120	0	8	33	17	53	1.3	7-15	333	4.5	4.0	276	305
WWAG 452	1121	0	2	27	17	62	1.3	7-16	235	5.0	2.9	342	289
WWAG 462	1122	0	47	73	20	65	2.0	7-15	541	4.3	2.2	707	624
WWAG 463	1123	0	50	77	20	67	2.0	7-16	502	4.5	2.4	624	563
WWAG 467	1124	0	8	67	17	65	1.0	7-13	65	4.8	1.6	793	429
WWAG 468	1125	0	43	83	15	60	1.0	7-14	327	4.2	2.8	526	427
WWAG 477	1126	0	17	93	22	63	1.3	7-16	579	4.3	1.8	659	619
WWAG 478	1127	0	15	53	23	42	1.3	7-15	440	4.1	3.7	413	427
WWAG 520	1128	0	37	50	20	48	1.7	7-16	535	4.2	3.1	478	507

Table 1. (continued)

Entry	MSP no.	Percent Heading		Plant Height (cm)		Lodging* 7/11	Harvest date	Seed Yield		Lbs/A 1981	2-yr ave. 79-81 (#'s/A)
		5/29	6/6	6/16	6/3			7/1	Lbs/A 1979		
NK-Exp. 's											
K1-148	1002	0	27	27	22	50	7-11	333	5.0	276	305
K1-150	1004	0	33	27	23	55	7-13	232	5.0	324	278
K1-159	1008	0	53	77	35	70	7-15	255	4.1	555	405
K1-160	1009	T	70	77	42	67	7-11	546	2.6	680	613
K1-194	521	0	17	60	17	43	7-15	466	4.3	333	400
K2-175	791	0	47	40	22	50	7-10	282	5.0	374	328
K3-45	1036	0	37	50	25	58	7-13	196	5.0	235	216
K3-166	1015	0	37	77	22	65	7-15	472	4.2	570	521
K3-204	783	0	27	63	23	57	7-12	460	4.3	282	371
K3-226	1197	0	33	70	30	67	7-15	140	4.8	493	317
K3-227	1016	0	67	67	42	68	7-14	416	4.3	440	428
K4-125	792	0	20	73	28	67	7-14	244	4.4	315	280
K4-126	793	0	20	70	28	68	7-12	306	4.1	368	337
K4-127	794	0	13	67	27	65	7-14	157	4.1	345	251
K4-136	1017	0	27	60	27	68	7-14	267	4.8	446	357
K4-137	1018	0	53	83	25	68	7-14	457	4.5	698	578
K4-138	1019	0	20	23	30	63	7-10	169	5.0	288	229
K4-139	1020	0	13	30	23	57	7-14	345	5.0	410	378
K5-22	1024	0	13	53	28	63	7-14	398	4.8	472	435
K5-63	1025	0	73	77	30	72	7-11	365	5.0	606	486
K5-64	1026	0	17	47	27	65	7-15	181	5.0	241	211
K5-65	1027	T	23	67	25	53	7-11	383	5.0	416	400
K5-66	1028	0	27	30	28	57	7-10	350	4.8	261	306
K5-67	1029	0	20	40	27	53	7-10	300	4.8	297	299
K6-30	1042	0	43	83	27	67	7-14	484	4.3	653	569

Table 1. (continued)

Entry	MSP no.	Percent Heading		Plant Height (cm)		Lodging* 7/11	Harvest date	Seed Yield		Lbs/A 1981	2-yr ave. 79-81 (# s/A)
		5/29	6/6	6/16	6/3			7/1	7/11		
K6-31	1043	T	47	77	27	67	3.7	7-14	505	564	535
K6-32	1044	0	67	87	27	67	4.0	7-12	457	659	558
K6-33	1045	2	80	80	42	70	4.0	7-10	392	484	438
K6-34	1046	T	90	80	52	60	4.7	7-8	404	229	317
K6-36	1048	0	90	80	55	67	5.0	7-11	350	345	348
K6-37	1049	2	90	80	52	73	4.3	7-10	386	339	363
K6-79	1198	0	17	47	23	52	1.3	7-11	249	362	306
K6-81	1200	T	57	63	30	70	3.3	7-13	451	460	456
K6-86	1201	T	70	83	42	67	4.0	7-14	285	347	316
K6-87	1202	T	77	80	43	67	3.7	7-8	487	552	520
K7-48	1203	0	73	87	35	67	3.7	7-12	419	487	453
K8-176	1204	0	43	77	23	62	2.0	7-14	564	472	518
N-1213	1211	2	20	57	20	50	1.3	7-14	196	309	253
Park	929	3	65	80	43	68	4.0	7-8	561	468	515

* - 1 = least and 5 = severe lodging.

LSD at 5% level 119
1% level 156

146
193

Table 2. Percent heading, plant height, lodging, harvest date, and seed yields for 26 Kentucky bluegrass strains selected for high seed yield seeded in 1977 on Melin Farm, Roseau, MN (1979 and 1981 data)

Entry	Company number	MSP no.	Percent heading		Plant Height (cm)		Lodging 7/11	Harvest date	1979 Lbs/A	1981 Lbs/A	2-yr Ave. Lbs/A
			5/29	6/6	6/16	6/3					
NK Exp	K1-76	996	4	77	80	43	77	3.0	481	446	464
	K1-78	1240	11	70	80	52	68	4.0	612	297	455
	K1-80	997	3	33	70	43	63	4.0	665	238	452
	K1-83	1241	T	43	63	45	62	3.7	787	267	527
	K1-88	988	0	17	30	27	60	4.3	552	220	386
	K1-119	999	T	43	73	43	70	4.0	633	451	542
	K1-121	1242	0	47	73	43	78	2.7	745	324	544
	K1-135	1255	0	23	67	27	63	2.7	404	413	409
	K1-138	1243	T	73	90	20	50	1.0	692	576	634
	K1-139	1244	0	23	53	37	55	4.0	496	157	327
	K1-140	1001	0	27	63	43	63	4.0	558	238	398
	K1-141	1245	0	33	67	40	62	4.0	671	321	496
	K1-152	1005	0	73	83	20	70	2.0	597	647	622
	K2-100	1005	0	50	67	33	70	3.7	232	434	333
	K2-161	1012	0	63	90	27	72	2.7	588	606	597
	K3-157	1014	0	73	90	40	73	3.7	282	544	413
	K3-160	1196	0	63	77	40	77	3.0	267	496	382
	K3-161	1246	T	83	87	52	82	5.0	523	431	477
	K6-80	1199	2	63	77	43	82	3.0	594	443	519
	K0-140	1253	6	80	87	47	72	4.0	784	425	605
Nugget	N6-106	1252	3	73	83	48	73	3.7	653	428	541
	4183-2	1247	0	77	80	30	72	3.0	555	597	576
		916	0	27	53	23	45	1.0	475	386	431
Park Pennstar Primo	1209	T	63	83	42	73	4.0	600	520	560	
	1249	0	53	53	25	48	1.7	211	306	259	
	1250	2	70	73	38	72	2.3	463	582	523	

LSD at 5%
1%

204
272

147
197

Table 3. Plant height, mildew readings, harvest date, desirability reading and seed yields for 15 Park Kentucky Bluegrass lines, seeded in July, 1978 on the Melin Farm, Roseau, MN (1979, 1980 and 1981 data).

Entry	MSP no.	Plant Height (cm)		Mildew* 6/6	Harvest date	Desirability** 1980	Seed yield (Lb/A)		
		6/3	6/18				7/1	1979	1981
U-8-2-1	1480	45	68	70	2.0	2.6	462	399	431
U-109-1	1481	45	66	69	2.3	2.8	444	390	417
U-109-3	1482	45	68	70	2.2	2.7	435	410	423
U-120-4	1483	48	69	70	2.1	2.5	491	408	450
U-138-3	1484	45	68	70	2.1	2.5	484	442	463
W-122-5	1485	45	69	70	2.0	2.7	446	341	394
W-128-4	1486	48	66	70	2.0	2.9	475	439	457
W-129-2	1487	49	68	70	2.2	2.5	417	435	426
W-130-5	1488	45	69	70	1.9	2.1	560	397	479
W-136-2	1489	46	66	70	2.1	3.0	442	352	397
W-136-6	1490	44	65	70	2.2	2.9	419	408	414
W-144-2	1491	45	66	70	2.1	2.9	406	399	403
W-152-1	1492	48	69	70	2.1	1.8	564	471	518
W-153-1	1493	46	68	70	2.0	2.5	466	435	451
W-155-1	1494	45	69	70	2.1	2.0	446	459	453
Park	895	46	70	70	1.9	2.6	488	428	458
Park	929	48	68	70	2.1	2.7	468	421	445
Park	1461	45	69	70	2.2	2.6	468	410	439

* - 1 = least, 5 = severe infection

** - 1 = most desirable, 5 = least desirable

LSD 5% =

1% =

NS NS NS

NS NS NS

Table 4. Percent heading, plant height, lodging, harvest date, ease of cleaning, and seed yields for 80 Kentucky Bluegrass strains seeded in 1979 on Melin Farm, Roseau, MN (1980 and 1981 data).

Entry	MSP no.	Percent heading		Plant Height (cm)		Lodging 7/11	Harvest date	Ease of cleaning	Seed yield	
		5/26	6/3	6/12	6/3				7/1	7/11
Aquila	1345	0	14	53	32	58	7-12	2.0	4.7	416
Arista	1573	0	12	85	25	55	7-14	2.0	3.3	659
Aspen	1204	0	10	73	28	67	7-16	1.7	4.4	716
Banff	1355	0	14	75	30	68	7-14	3.0	4.2	615
Baron	1550	0	2	75	27	60	7-13	3.0	4.1	989
Claudia	1545	0	9	77	30	67	7-11	2.0	4.4	585
Dormie	1303	0	57	90	33	63	7-8	4.3	1.7	612
Emmundi	1147	0	4	52	28	63	7-11	1.0	4.4	546
Entopper	1570	0	4	60	30	63	7-15	3.0	3.9	644
Escort	1571	0	12	68	33	67	7-14	3.0	4.3	463
Gardi	1106	0	13	63	23	57	7-15	3.3	3.3	413
Geronomo	1546	0	20	68	38	63	7-8	2.0	4.0	873
Glade	1574	0	5	28	30	63	7-12	2.0	4.4	443
Granada	1194	0	8	42	30	63	7-10	1.0	5.0	434
Holt	1565	88	77	98	45	58	7-3	3.0	3.0	481
Kimono	1547	0	17	55	27	57	7-10	3.0	2.9	535
Mentor	1346	0	12	42	30	58	7-9	1.0	5.0	359
MLM-18011	1531	0	12	82	28	63	7-15	3.0	4.4	849
Mom-Pp H519	1283	0	17	68	30	65	7-9	2.0	4.8	692
Mom-Pp 1417	1543	0	8	78	30	57	7-11	2.0	3.5	832
Mom-Pp 1765	1544	0	10	87	27	58	7-9	1.3	4.4	858
Mosa	1548	0	5	85	25	60	7-9	2.0	4.4	731
Nugget	1464	0	18	80	22	47	7-13	2.0	4.1	434
Parade	1347	0	17	80	30	65	7-15	2.0	4.1	591
Park	1461	0	63	73	47	70	7-3	2.0	2.6	647



Table 4. (continued)

Entry	MSP no.	Percent heading		Plant Height (cm)		Lodging 7/11	Harvest date	Ease of cleaning	Seed yield	
		5/26	6/3	6/12	6/3				7/1	1980 Estimate
P-141	1305	3	73	63	37	60	7-8	4.3	4.1	386
P-143	1356	0	10	60	27	67	7-9	3.0	4.8	446
Ram 1	1551	0	7	77	30	60	7-13	2.0	4.8	680
NF-1213	1462	0	17	63	23	48	7-14	2.0	3.6	496
Rugby	1007	0	20	78	32	63	7-9	2.0	4.1	671
Tivoli	1105	0	4	75	22	53	7-16	3.0	3.7	511
Trenton	1579	0	23	75	33	67	7-13	3.0	4.0	517
Troy	936	8	90	67	53	77	7-3	3.0	3.3	460
Touchdown	934	0	20	35	35	68	7-9	2.0	4.4	273
Vanessa	1549	0	7	78	27	62	7-10	3.0	4.3	701
Welcome	1403	0	4	35	32	57	7-9	2.7	4.2	223
K-Exp's										
K3-162	1575	22	87	57	50	63	7-8	3.0	3.3	523
K3-167	1401	T	87	63	48	73	7-9	3.0	3.8	454
K3-168	1576	T	87	65	47	68	7-8	4.0	4.0	324
K3-170	1402	T	83	67	47	67	7-8	4.0	4.2	374
K3-178	1577	0	30	77	33	67	7-13	2.7	4.3	558
K3-179	1578	0	30	67	37	67	7-12	2.7	4.4	306
K7-103	1404	0	17	63	37	58	7-12	2.7	4.7	279
K7-104	1405	0	80	70	45	72	7-11	2.7	3.8	695
K7-105	1406	0	80	68	47	72	7-10	3.0	3.7	695
K7-138	1410	0	20	90	28	63	7-16	2.3	3.7	778
78033	1411	0	17	78	30	57	7-9	2.0	3.9	570
78037	1412	0	77	70	45	70	7-10	2.0	3.2	636
78038	1413	T	93	78	47	73	7-8	3.0	3.5	576
78053	1414	2	77	85	45	75	7-8	3.0	3.7	576

Table 4. (continued)

Entry	MSP no.	Percent heading		Plant Height (cm)		Lodging 7/11	Harvest date	Ease of cleaning	Seed yield	
		5/26	6/3	6/12	6/3				7/1	7/1
78054	1415	0	37	72	43	4.7	7-10	3.0	4.1	342
78055	1416	14	90	70	50	2.3	7-8	1.7	3.9	514
78056	1417	2	90	67	55	3.0	7-9	2.7	3.8	582
78059	1420	0	77	73	45	3.0	7-12	2.0	4.5	475
78060	1421	2	90	72	50	2.3	7-9	3.0	3.9	448
78061	1422	0	10	75	35	4.7	7-13	3.3	4.3	327
78063	1424	T	87	77	47	3.7	7-8	2.0	3.2	674
78064	1425	T	87	75	45	4.0	7-9	4.0	3.3	639
78065	1426	0	57	68	47	3.0	7-12	3.0	4.2	481
78066	1427	0	77	73	45	3.7	7-10	3.7	3.5	502
78067	1428	0	70	72	47	4.3	7-9	3.0	2.7	695
78068	1429	0	73	75	47	4.0	7-10	3.0	2.6	722
78069	1430	0	80	75	45	4.0	7-10	3.0	2.6	677
78070	1431	T	83	73	47	4.0	7-12	3.0	2.6	722
78071	1432	T	77	70	47	4.3	7-10	3.0	3.1	630
78072	1433	T	83	73	47	4.0	7-8	3.0	2.9	698
78073	1434	T	87	77	47	3.3	7-10	3.0	3.1	653
78074	1435	T	80	75	48	3.7	7-8	3.3	2.9	609
78075	1436	T	87	75	50	3.0	7-8	3.3	3.0	606
78076	1437	2	73	70	50	3.0	7-8	3.7	3.4	478
78077	1438	4	73	73	47	3.3	7-10	2.7	3.3	573
78078	1439	0	37	70	42	4.3	7-12	3.3	4.0	321
78079	1440	0	53	65	42	4.3	7-13	3.0	4.1	446
78080	1441	0	30	62	40	4.7	7-13	3.3	4.0	365
78081	1442	0	40	67	38	5.0	7-14	4.0	4.0	345
78082	1443	0	40	65	40	5.0	7-13	3.3	4.1	386
78083	1444	0	50	67	40	4.7	7-12	3.0	4.3	404
78084	1445	0	38	65	40	5.0	7-12	3.0	4.3	425
78085	1446	0	33	62	40	5.0	7-13	4.0	4.3	345
78086	1447	0	32	68	40	4.7	7-13	4.0	4.3	377

LSD

5%

1%

189

Table 5. Percent stand, vigor, percent heading, plant height and estimated seed yields on 28 Kentucky Bluegrass strains seeded in 1980 on Welin Farm, Roseau, MN (1981 data).

Entry	MSP number	Percent stand 4/16	Vigor*		Percent Heading		Plant Height (cm)			Estimated Seed Yield** 7/7
			4/16	5/17	6/6	6/12	6/3	6/17	7/1	
America (ISI 154)	1695	67	3.1	3.1	27	37	12	28	43	2.2
Aquila (K8-145)	1038	73	3.1	2.4	10	7	20	42	48	4.1
Barblue	1672	90	3.0	2.3	27	33	17	42	53	2.0
Baron	1673	83	3.3	2.6	17	15	15	32	47	3.3
Bar. Pp 80-T	1674	73	3.1	2.9	5	T	13	32	40	4.4
Bartissimo	1675	80	3.1	2.3	7	3	13	37	50	3.8
Caroline	1633	70	3.0	2.7	4	4	17	33	53	4.0
Cynthia	1634	80	3.8	3.0	10	10	15	35	47	3.8
Emmundi 11.0007	1603	87	2.7	1.6	27	20	32	47	57	3.7
Escort	1571	57	3.3	2.4	13	12	18	40	55	4.0
Gardi	1106	60	4.0	3.4	T	T	10	27	28	4.7
ISI-128	1693	80	3.7	2.8	8	5	15	35	50	4.0
Merit	1694	70	3.0	3.0	8	T	12	33	42	4.0
Miranda	1635	57	3.0	3.3	8	2	15	32	45	4.0
MLM-18011	1657	90	3.1	2.7	8	12	15	33	50	3.3
Monopoly	1586	83	2.4	1.6	12	6	23	50	63	3.4
Newport	1248	83	3.1	2.7	13	8	23	42	50	4.0
Nugget	1589	83	3.4	2.9	10	3	17	28	38	4.2
Parade (K1-192)	1347	90	2.3	2.0	35	50	20	43	55	2.0
Park (N4-117)	1461	80	2.8	2.0	27	18	28	50	53	3.8
P-141	1649	67	3.0	2.3	20	12	23	38	48	4.0
PPT-6	1651	87	2.8	2.7	T	T	12	27	35	4.8
Ram I	1652	80	3.1	2.4	13	15	15	32	35	3.7
RR-10	1591	80	3.4	2.9	7	8	15	37	38	3.8
Rugby (K1-155)	1738	87	3.1	2.0	30	37	15	42	60	2.0
Saskia	1636	80	3.4	3.1	7	T	12	32	45	4.1
Tivoli	1105	83	3.7	3.5	5	T	7	20	30	4.5
Touchdown	934	87	3.1	2.3	5	T	17	33	45	4.5

* - 1 = most vigorous, 5 = least vigor, ** - 1 = best seed, 5 = least.

Table 6. Residue, turf quality, percent heading, plant height, harvest date and seed yields for 9 Kentucky bluegrass varieties grown under three fertilizer levels, and two cultural management regimes. Seeded in 1976 on Welin Farm, Roseau, MN.

Entry	Fertilizer rate	July Burn					Harvest date	Seed Yield (#/A)			
		Residue* 4-15	Turf Quality** 4-15	Percent heading 6-6	Plant Height (cm) 7-1	Harvest date		1981	1979	1978	3-yr ave.
								1981	1979	1978	3-yr ave.
Aquila	50+25+25	3.0	3.2	33	30	7-9	350	422	534	435	
Aspen		4.0	3.3	40	10	7-10	276	241	457	325	
Baron		4.0	3.4	27	8	7-9	769	637	726	711	
Emmundi		3.7	2.4	12	8	7-9	172	82	330	195	
Parade		3.7	3.0	30	32	7-9	446	330	607	461	
Park		1.0	2.0	30	35	7-6	270	486	557	438	
Rugby		4.0	3.0	43	15	7-9	395	296	482	391	
Touchdown		3.3	3.3	17	13	7-9	125	104	317	182	
Trenton		3.0	3.7	33	27	7-8	368	332	489	396	
							Ave.	352	500	393	
Aquila	100+50+50	2.0	2.4	37	32	7-8	362	348	645	452	
Aspen		4.0	3.0	40	13	7-13	400	415	547	467	
Baron		3.7	4.0	30	10	7-9	802	730	900	811	
Emmundi		3.3	3.3	8	10	7-10	267	59	415	247	
Parade		3.0	2.7	27	17	7-13	457	494	773	575	
Park		1.0	1.1	43	33	7-6	413	415	507	445	
Rugby		4.0	2.7	40	13	7-13	487	436	675	533	
Touchdown		2.3	3.0	20	22	7-9	187	86	418	230	
Trenton		3.0	2.1	37	27	7-11	538	422	639	533	
							Ave.	439	613	477	
Aquila	150+75+75	2.0	2.0	37	35	7-10	398	214	547	386	
Aspen		3.3	3.4	12	10	7-13	261	472	562	432	
Baron		2.7	3.7	20	13	7-9	829	400	861	697	
Emmundi		2.3	2.7	7	13	7-13	285	76	446	269	
Parade		2.7	3.0	20	20	7-13	353	391	725	490	
Park		1.3	1.7	37	32	7-6	431	373	491	432	
Rugby		3.3	3.0	27	12	7-14	419	313	616	449	
Touchdown		2.3	3.3	18	15	7-9	119	126	419	221	
Trenton		2.7	1.7	20	25	7-10	362	403	568	444	
							Ave.	384	582	424	

* - 1 = most, 5 = least residue

** - 1 = thick turf, 5 = open areas

Table 6. (continued)

Entry	Fertilizer rate	Residue* 4-15	Turf Quality** 4-15	Percent heading 6-6	Clip-Rake off		Harvest date	Seed Yield (#/A)			
					Plant Height (cm) 6-3	7-1		1981	1979	1978	3-yr ave.
Aquila	50+25+25	2.8	1.0	23	25	32	7-9	434	446	666	515
Aspen		4.7	1.0	18	7	33	7-12	342	341	476	386
Baron		4.1	1.0	22	7	37	7-9	826	888	928	881
Enmundi		4.7	1.0	4	5	28	7-9	279	317	503	366
Parade		3.8	1.0	20	22	43	7-10	425	492	593	503
Park		1.0	1.0	27	32	52	7-6	267	497	660	475
Rugby		4.3	1.0	30	10	40	7-10	410	399	494	434
Touchdown		4.1	1.0	33	15	42	7-9	300	287	446	344
Trenton		3.4	1.0	23	23	43	7-9	463	398	541	467
								Ave.	416	452	486
Aquila	100+50+50	2.4	1.0	30	25	42	7-9	362	627	680	556
Aspen		4.1	1.0	17	8	35	7-12	297	538	589	475
Baron		4.0	1.0	27	8	40	7-9	757	1062	1067	962
Enmundi		4.3	1.0	5	7	32	7-12	226	531	549	435
Parade		3.3	1.0	17	20	48	7-14	374	641	691	569
Park		1.0	1.0	43	33	53	7-6	386	496	657	513
Rugby		3.7	1.0	35	8	43	7-14	413	560	488	487
Touchdown		3.3	1.0	33	13	50	7-9	333	329	506	389
Trenton		3.1	1.0	30	17	43	7-10	377	641	672	563
								Ave.	603	655	550
Aquila	150+75+75	2.0	1.0	20	23	42	7-9	217	447	804	489
Aspen		4.0	1.0	5	5	33	7-14	166	650	686	501
Baron		4.1	1.3	13	7	38	7-13	555	789	1091	812
Enmundi		4.3	1.0	2	5	33	7-14	288	562	691	514
Parade		3.0	1.0	27	23	45	7-14	416	592	721	576
Park		1.3	1.0	23	27	48	7-6	279	485	670	478
Rugby		3.7	1.0	20	8	38	7-14	312	589	611	504
Touchdown		3.0	1.0	30	10	45	7-10	232	177	499	303
Trenton		2.7	1.0	20	20	48	7-13	315	623	773	570
								Ave.	309	727	527

* - 1 = most, 5 = least residue
 ** - 1 = thick turf, 5 = open areas

Table 11. Percent stand, vigor, plant height, harvest date and seed yield for 6 Timothy varieties with two fertilizer rates. Seeded in 1980 on the Welin farm (1981 data).

Entry	Fertilizer rate	Percent stand 5-17	Vigor* 5-17	Plant Height (cm) 7-24	Harvest date	Seed Yield (lb/A)
Bartimi	80+40+40	73	2.4	97	8-7	483
Champlain	"	88	3.9	113	8-11	557
Climax	"	75	2.1	112	8-7	672
Goliath	"	83	1.8	95	8-7	469
Heidemij	"	73	3.1	100	8-17	373
Hokushu	"	71	2.4	101	8-13	453
Bartimi	120+60+60	73	2.4	97	8-7	501
Champlain	"	88	3.9	115	8-11	632
Climax	"	75	2.1	107	8-7	761
Goliath	"	83	1.8	94	8-7	462
Heidemij	"	73	3.1	100	8-17	453
Hokushu	"	71	2.4	99	8-13	454

* - 1 most vigor, 5 = least vigor

Table 12. Winter injury, percent stand, vigor, plant height and percent heading of 24 Fine Fescues strains seeded in 1980 on the Welin farm (1981 data).

Strain	MSP no.	Winter injury* 4-16	Percent stand 4-16	Vigor*		Plant height (cm)		Percent heading	
				4-30	5-17	6-5	7-1	6-4	6-16
Atlanta	1164	2.9	83	3.4	3.2	15	52	T	2
Barfalla	1685	3.1	83	3.3	3.4	18	53	T	2
Barcota	1683	3.4	77	4.0	4.1	13	45	T	2
Bar-Frc-79-Lau	1684	3.4	83	3.4	3.4	20	52	4	7
Bar-Frt-H1	1686	3.0	87	3.0	3.2	17	55	T	2
Checker 17.0014	1608	3.2	80	3.7	3.1	18	52	7	4
FL-1	1655	3.0	77	3.1	3.1	32	53	50	70
Jamestown	1656	3.1	80	3.4	3.1	22	53	2	5
Longfellow 17.0015	1609	3.3	73	3.5	3.3	20	50	4	7
Mom Frc-57	1638	3.1	87	3.2	2.9	17	52	2	5
Mom Frc-61	1638	3.2	80	3.7	3.8	15	48	2	4
Mom Frc-64	1640	3.2	77	3.7	3.4	18	48	T	3
Mom Frr-38	1641	3.1	80	3.0	2.1	23	60	11	12
Mom Frr-205	1642	2.8	80	2.7	2.7	27	62	7	47
Moncorde	1637	2.9	83	2.8	3.0	27	63	10	57
Univ. of Minn-66354	1721	3.2	73	3.4	3.3	28	58	9	15
-6673	1722	3.1	63	3.4	3.0	28	62	15	42
-66111	1723	3.0	67	3.1	2.7	32	57	5	17
-66136	1726	2.7	77	3.0	2.0	32	58	8	28
-66218	1727	2.9	70	3.2	2.7	30	58	10	38
-66223	1728	3.1	73	3.3	2.8	25	65	4	12
-66233	1729	2.7	73	3.0	2.0	30	68	17	15
-67123	1724	2.8	73	3.1	2.2	30	68	20	28
-67135	1725	2.8	80	3.0	2.0	33	53	13	18

* 1 = best plant, 5 = poorest.

Table 13. Percent heading, plant height, harvest date, and seed yields for six fescue strains seeded in 1979 on the Melin Farm, Roseau, MN (1980 and 1981 data).

Species	Entry	MSP no.	Percent heading		Plant height (cm)		1981 Harvest date	Seed yields (lb/A)			
			6/3	6/6	6/16	7/1		1980	1981	2-yr ave.	
Meadow fescues	Beaumont	1553	0	0	73	40	7-14	425	496	461	
	First	1500	0	2	83	45	7-14	339	653	496	
Tall fescues	K2-28	1168	0	2	57	42	7-15	389	627	508	
	Hokuryo	1506	0	0	77	50	7-14	395	838	617	
	Yamanami	1507	T	30	87	48	7-13	122	829	476	
Chewings fescue	Jamestown	1552	23	93	30	38	7-13	33	330		
								LSD AT 5% level		108	163
								1% level		154	232

Table 14. Percent stand, vigor, plant height, heading score harvest date and seed yields of 9 Meadow Fescue strains seeded in 1980 on Cenex Farm, Roseau, MN. (1981 data)

Entry	MSP no.	Percent stand		vigor*		Plant height (cm) 6/17	Heading*	Harvest date	Seed yields (lb/A)
		4/30	5/17	4/30	5/17				
Bar-Fp81-5	1682	67	60	3.1	3.0	52	1.7	7-13	383
Beaumont	1553	67	70	3.0	2.5	60	2.8	7-14	255
Belimo	1643	67	68	2.9	2.0	65	1.9	7-14	478
Bundy	1706	63	63	2.9	2.6	57	3.0	7-14	238
Comtessa	1707	50	53	3.3	2.7	60	3.0	7-14	285
Fiola	1708	10	3	4.3	4.0	-	4.7	-	-
First	1736	80	80	2.0	1.0	68	1.7	14	564
Garanta	1716	70	53	3.2	2.7	67	2.3	14	398
Sena	1709	67	73	3.0	1.6	60	2.2	14	368

L.S.D. 5% = 161
1% = N.S.

Table 15. Percent stand, vigor, percent heading, plant height, harvest date and seed yields for 8 Tall Fescue strains seeded in 1980 on Cenex Farm, Roseau, MN (1981 data).

Entry	MSP no.	Percent stand		Vigor		Percent heading* 6/29	Plant height (cm) 6/17	Harvest date	Seed yield (lb/A)
		4/30	5/17	4/30	5/17				
Barcel	1680	63	60	3.0	2.7	3.2	62	7-16	279
Bar-Fa-75-X	1681	63	55	3.3	3.0	3.4	58	7-16	217
Hokuryo	1506	47	40	3.6	3.0	3.8	75	7-16	122
L. F. A.-Syn-1	1653	77	72	3.1	2.9	3.7	58	7-16	190
NAPB-147801	1617	67	60	3.1	3.0	3.0	63	7-16	270
NAPB-147802	1618	63	67	3.0	2.7	2.7	62	7-16	368
Rebel	1654	67	67	3.1	2.7	3.2	57	7-16	312
Yamanami	1507	77	77	2.5	1.7	3.7	60	7-14	113

LSD at 5% level 105
1% level 146

* - 1 = best, 5 = poorest heading

Table 16. Percent stand, vigor, heading, plant height, harvest date and seed yields for 22 strains of Perennial Ryegrass seeded in 1980 on the Genex Farm, Roseau, MN. (1981 data).

Entry	MSP no.	Percent Stand		Vigor		Standing* 6/29	Plant height (cm) 6/17	Harvest date	Seed yield (lbs/A)
		4/30	5/17	4/30	5/17				
Aristocrat	1644	67	70	3.5	3.1	3.0	37	8-9	573
Barry	1687	67	73	3.0	3.0	4.2	25	8-12	413
Del Ray (K5-90)	1386	80	83	3.3	2.8	1.3	42	8-8	428
Kiyosata	1508	80	70	3.5	2.4	3.1	43	8-9	383
NAPB-137901	1619	77	77	3.5	2.3	2.3	38	8-8	446
NAPB-137902	1620	80	87	3.0	2.0	2.1	47	8-8	356
NK-Exper K2-176	1376	63	48	3.3	2.8	3.4	37	8-11	428
K3-40	1380	50	50	3.8	3.3	4.2	28	8-11	469
K3-41	1381	57	53	3.5	3.1	3.7	35	8-8	523
K3-42	1382	67	60	3.5	3.2	4.2	30	8-12	457
K5-31	1384	83	78	2.6	1.9	4.1	33	8-8	538
K5-88	1385	77	73	3.2	2.9	3.1	37	8-8	244
K5-92	1387	83	77	2.9	2.6	2.0	37	8-8	428
K5-94	1388	80	90	3.2	2.0	2.0	38	8-8	612
K5-683	1389	73	75	3.2	2.3	2.0	40	8-8	701
K5-683	1390	73	70	3.1	2.7	2.7	37	8-8	591
K6-78-1	1391	73	67	3.3	3.0	2.4	35	8-8	428
K6-78-2	1392	70	70	3.5	3.4	2.8	37	8-8	407
K6-83-2	1393	63	53	3.4	3.4	3.4	32	8-8	392
NK-200	1584	73	77	3.0	3.1	4.1	32	8-12	555
Regal (13-0046)	1621	70	68	3.3	3.3	3.1	35	8-8	416
Yatsugane	1509	60	33	4.1	3.8	4.5	22	--	---

* 1 = best, 5 = least heading
 LSD at 5% level 165
 1% level 222

Table 17. Percent heading, plant height, harvest date and seed yields for 6 orchardgrass strains seeded in 1979 on the Welin Farm, Roseau, MN (1980 and 1981 data).

Entry	MSP no.	Percent heading			Plant height (cm)		1981 Harvest date	Seed yield (lb/A)		
		6/3	6/6	6/16	6/3	7/1		1980	1981	2-yr ave.
Akimidori	1502	6	13	27	53	117	7-22	30	217	124
Aonami	1503	T	9	40	50	122	7-22	71	220	146
Kitamidori	1504	4	22	63	55	120	7-15	81	463	272
Okamidori	1505	0	2	50	52	123	7-22	211	659	435
Piedmont Syn 2	1542	0	5	20	52	113	7-20	45	184	115
Nordstern	1177	0	0	12	53	125	7-24	303	609	456
								LSD at 5% level		203
								1% level		288

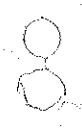


Table 18. Percent stand, vigor, heading, plant height, harvest date and yield of 12 orchardgrass strains seeded in 1980 on Cenex Farm, Roseau, Minnesota (1981 data).

Entry	MSP no.	Percent stand		Vigor*		Heading** 6/29	Plant height (cm) (6/17)	Harvest date	Seed yields (lb/A)
		4/30	5/17	4/30	5/17				
Akimidori	1502	63	50	3.4	3.1	4.5	48		NH
Aonami	1503	70	57	3.3	3.2	4.3	60		NH
Barbridge	1678	70	63	3.4	2.8	4.3	57		NH
Barera	1679	70	65	3.3	3.5	4.3	38		NH
Bartyle	1677	77	78	2.6	1.8	4.0	67	7-17	89
Crown	1610	77	78	2.6	2.7	3.8	63		NH
Hawk	1611	67	68	3.3	3.3	4.4	62		NH
Kitamidori	1504	80	80	2.7	1.9	4.1	63	7-16	59
NAPB-417901	1612	70	63	3.3	3.4	4.3	62		NH
Nordstern	1177	73	67	2.7	1.9	3.9	58	7-22	163
Okamidori	1505	70	73	3.1	2.8	4.2	50		NH
Piedmont Syn-2	1542	43	20	4.2	4.2	4.5	33		NH

* - 1 = best, 5 = poorest vigor. Can be interpreted as winter injury.

** - 1 = best, 5 = least heading.

NH = Not harvested.

Table 19. Percent heading, heading rating, plant height, and seed yields for 10 Reed Canarygrass strains seeded in 1979 on the Melin Farm, Roseau, MN (1981 data).

Strain	MSP no.	Percent heading		Head rating* 6/29	Plant height (cm)			Seed yields (lbs/A)	
		6/6	6/12		6/16	6/3	6/18	7/1	7/6
Commercial	1251	T	13	73	70	122	152	342	294
Flare	1301	T	18	67	72	123	158	526	564
Hansvo11	1541	0	0	T	35	57	57	-	-
Mn-76	1109	T	25	73	75	127	153	151 ⁺	398 ⁺⁺
Mn-7904	1540	0	0	2	53	88	112	6	30
NRG-721	867	0	10	53	67	118	153	440	701
PS-2	1302	T	20	77	70	127	160	609	802
Rise	1142	T	8	43	73	123	155	336	532
Rovik	1539	0	T	4	60	88	90	-	-
Vantage	1145	T	22	60	72	127	155	493	650
							LSD - 5% level	151	240
							1% level	211	337

* Head rating - 1 = best filled and compact, 5 = least filled.

⁺ Mn-76 harvested 7/3.

⁺⁺ Mn-76 harvested 7/6.

Table 20. Percent heading, plant height, harvest date and seed yields for 8 Smooth Bromegrass strain seeded in 1980 on the Melin Farm, Roseau, MN (1981 data).

Entry	MSP no.	Percent heading			Plant height (cm)		Harvest date	Seed yield Lb/A	
		6/4	6/5	6/6	6/12	6/5			6/17
Baylor	1136	30	57	30	27	48	80	95	199
Blair	1137	27	53	23	13	40	77	92	125
Barton	1746	27	50	33	22	45	78	103	149
MLM-13011	1294	43	33	37	28	43	82	98	193
NAPB-407601	1605	47	47	47	33	43	82	100	255
NAPB-407602	1606	30	33	20	20	40	78	98	110
NAPB-407603	1607	23	33	23	23	42	80	100	175
Wisconsin B-8	1662	30	40	27	23	45	80	97	160

Table 21. Seed yields and winter injury ratings for birdsfoot trefoil varieties.

VARIETY	1979		1981		1981		1981		3-YEAR AVERAGE	
	SEED YIELD lbs/acre†	SEED YIELD lbs/acre†	SEED YIELD lbs/acre†	WINTER INJURY ROSEAU‡	WINTER INJURY ST. PAUL‡	WINTER INJURY ROSEAU‡	WINTER INJURY ST. PAUL‡	WINTER INJURY ROSEAU‡	WINTER INJURY ST. PAUL‡	WINTER INJURY ROSEAU‡
CARROLL	283 abc	395 ab	2.0 b	1.10 a	1.72 ab					
CASCADE	265 abc	183 abc	3.67 de	-- --	3.46 ef					
DAWN	314 ab	271 abc	3.0 cd	2.25 c	2.45 abcd					
EMPIRE	208 bcd	158 bc	3.33 cde	2.20 c	2.72 cde					
FARGO	-- --	225 abc	3.67 de	-- --	-- --					
KALO	217 bcd	224 abc	2.67 bc	-- --	3.17 def					
KENTUCKY ECOTYPE	357 a	329 abc	2.67 bc	1.80 b	2.77 cde					
LEO	308 abc	537 a	1.0 a	1.20 a	1.56 a					
MACKINAW	194 cd	183 abc	2.67 bc	2.15 bc	2.00 abc					
MANSFIELD	305 abc	233 abc	4.00 e	3.00 d	3.70 fg					
Mo-20	272 abc	195 abc	2.67 bc	1.95 bc	2.56 bcde					
NORCEN	312 ab	360 ab	2.00 b	1.40 a	2.05 abc					
VEGA II	125 d	0 c	5.00 f	-- --	4.45 g					
VIKING	293 abc	233 abc	3.00 cd	2.25 c	3.00 def					

† Seeded in 1978.

‡ Seeded in 1980.

§ 1.0 is least injury and 5.0 is most injury.

¶ Means in each column followed by unlike letters differ significantly at the .05 level.

200