



Crop Science Report

RESEARCH/EXTENSION

OREGON

FORAGE AND TURF GRASS VARIETY SEED YIELD TRIAL -- 1986

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INTRODUCTION

Evaluation of seed yield potential of new varieties and advanced breeding lines in the area of specialist seed production is of value to plant breeders, seed trade, and seed producers. A fee-supported seed yield evaluation program has been in progress at Oregon State University since 1981. Results of these studies have been reported (Youngberg et al. 1985; Youngberg et al. 1986).

Varieties are grown under western Oregon conditions and observed for two years. The seed yield, harvest index, mean seed weight, plant height, heading date, anthesis date, and lodging characteristics are recorded and reported.

METHODS

The trial, designed to follow commercial field practices of Willamette Valley seed growers was located at Hyslop Crop Science Field Laboratory, Corvallis, Oregon. The trial was planted on a Woodburn silt loam soil. Perennial species in this trial were planted in May, 1985. Details on the establishment and management of perennial species during the first year, are reported in Tables 1-3.

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Seeding rates were adjusted for germination percentages and mean seed weight to allow planting of an equal number of pure live seed per length of row. Row spacing was 12 in (30 cm) for all species except tall fescue and orchardgrass, which were spaced 18 in (45 cm) apart. Four replications of each variety were established. Plots were planted with a circular belt planter in either 2 or 3-plots (depending on row spacing) so that all plots were 3 ft (0.9 m) wide and 15.6 ft (4.75 m) in length. A blank row was used to separate entries within blocks. A border plot was used at the boundary of blocks. A standard variety was included for each species. Seeding rates dates and row spacing are shown in Table 1.

Table 1. Seeding rate and date, row width, and mean number of seed per row for variety seed yield evaluation trial.

Species	Mean number seeds per:		Approximate Seeding rate		Row width		Seeding date
	(ft)	(m)	(lb/a)	(kg/ha)	(in)	(cm)	1985
Perennial ryegrass	58	190	10.7	12.0	12	30	May 5
Fine-leaf fescue	61	200	4.5	5.0	12	30	May 4
Bluegrass	61	200	4.5	2.2	12	30	May 4
Orchardgrass	64	210	4.5	5.0	18	45	May 5
Tall fescue	61	200	8.9	10.0	18	45	May 5
Italian ryegrass	55	180	13.4	15.0	12	30	Sept. 5

All perennial species were irrigated with 1.5 inches (3.8 cm) of water on May 12 and May 21, 1985. A third irrigation with 2.0 inches (5.0 cm) was applied on August 9, 1985.

Weed control following establishment of perennial varieties included Buctril^R (bromoxynil) at 0.5 lb ae/a (0.56 kg ae/ha) on May 30, 1985 and on October 9, 1985. Additional autumn chemical weed control was applied on October 28, 1985 as shown in table 2.

Italian ryegrass varieties were seeded on September 5, 1985 following a surface application and incorporation of 200 lb/a (224 kg/ha) of 16-20-0 fertilizer into the seedbed on September 3, 1985. All Italian ryegrass varieties were subsequently treated with the herbicides Buctril^R (bromoxynil) at 0.5 lb ae/a (0.56 kg ae/ha) on October 9, 1985, and Nortron^R (ethofumesate) at 1.0 lb ai/a (1.12 kg ai/ha) on October 28, 1985.

Table 2. Autumn 1985 herbicide application.

Species	Herbicide	Rate ¹	
		(lb ai/a)	(kg ai/ha)
Perennial ryegrass	AAtrex 80W ^R (atrazine)	1.2	1.35
Fine-leaf fescue	Princep 80W ^R (simazine)	2.0	2.24
Bluegrass, Orchardgrass & Tall fescue	Karmex 80W ^R (diuron)	2.4	2.69

¹Applied October 28, 1985

In addition, all varieties were sprayed with a tank mix of 2,4-D low vol. ester at 0.75 lb ae/a (0.84 kg ae/ha) and dicamba at 0.25 lb ae/a (0.28 kg ae/ha) on February 10, 1986.

Spring fertilizer was applied as urea to all entries on February 16, 1986 (Table 3).

Table 3. Spring 1986 fertilizer application

Species	Rate ¹		N (Actual)	
	(lb/a)	(kg/ha)	(lb/a)	(kg/ha)
Perennial ryegrass				
Italian ryegrass	240	269	110	123
and Fine-leaf fescue				
Tall fescue and	174	195	80	90
Orchardgrass				
Bluegrass	304	341	140	157

¹Applied in the form of 46-0-0 for all species on February 26, 1986.

Fungicide treatment included Bravo 500^R at 3 pints/a (3.6/l ha) for tall fescue and orchardgrass on April 17, 1986. Tilt^R was applied at 4 fl. oz a (0.3/l ha) for rust control on perennial ryegrass and bluegrass. Five applications were made to both species on April 17, 30, May 12, 23, and June 6, 1986.

All varieties were checked on a weekly schedule from March 26, 1986 until maturity. Dates were recorded when approximately 50% of the stand had headed (heading date) and when exerted anthers were first apparent (anthesis date). In addition, the date on which lodging first became apparent within each plot was recorded (lodging date), along with a percentage estimate of the area affected (area lodged) and the severity of

that lodging on a scale of 1 - 5. Plant height measurements were recorded on June 18, 1986.

The entire plot area was harvested at maturity using a small plot harvester incorporating a sickle bar cutter and draper designed for efficient bagging of the above ground plant biomass (reported as total dry weight). The bagged material was air-dried, threshed, cleaned and weighed to calculate seed yield. A 3 to 5 gram seed sample of each plot was taken with a seed divider to determine the 1000 seed weight. In addition, harvest index was calculated for each entry:

$$\text{Harvest Index} = \frac{\text{Clean seed weight}}{\text{Total harvested weight}} \times 100$$

Data from each species were subjected to a randomized block analysis of variance and least significant difference test to determine differences among variety means.

RESULTS AND DISCUSSION

A good stand was developed for all species.

The weather during June 1986 was warmer and drier than normal (Table 10). Several of the early species were stressed and high temperature may have interfered with effective pollination.

Harvest dates and other observations are presented in Tables 4-9. Yields expressed as a percent of the standard variety for each species are also reported.

Seed yields from research plots should be compared with known standard varieties rather than using the absolute figures to estimate potential yields under commercial production conditions. Plot harvest methods reduce shattering and other harvest losses that normally occur in commercial production.

Table 4. 1986 seed yield of perennial ryegrass varieties.

Variety Name	Seed Yield		Total Dry Weight	Harvest Index	1000 Seed wt.	Plant Height	Heading Date	Anthesis Date	First Lodging			Harvest Date
									Date	Area	Severity ¹	
	(lb/a)	(%Std.)	(lb/a)	(%)	(g)	(cm)				(%)		
Mom Lp 763	1692	137	6435	12.6	1.66	86.9	22-May	05-Jun	28-Apr	30	2.0	05-Jul
Kemal	1519	123	8621	9.7	3.38	100.5	22-May	05-Jun	03-May	33	2.0	05-Jul
Verna	1281	104	6830	8.9	2.06	102.0	22-May	29-May	24-Apr	33	2.0	05-Jul
Linn (Std)	1233	100	7381	8.0	2.29	90.8	15-May	29-May	29-Apr	30	2.0	05-Jul
DP-73-4-32	1192	97	6982	8.3	1.97	98.0	20-May	29-May	29-Apr	18	2.0	05-Jul
Sisu	1188	96	6586	8.8	1.85	87.8	29-May	05-Jun	24-Apr	45	2.0	15-Jul
Chantal	1180	96	7285	7.8	1.74	88.5	31-May	05-Jun	24-Apr	48	2.0	15-Jul
DP-1-6P	1174	95	6796	8.2	2.18	90.5	15-May	31-May	01-May	18	2.0	05-Jul
Pennfine	1122	91	7141	7.5	1.93	94.1	22-May	29-May	24-Apr	38	2.0	05-Jul
Vejo	1113	90	7462	7.3	1.88	100.4	15-May	29-May	29-Apr	38	2.0	05-Jul
Tonga	982	80	6829	6.9	3.40	105.0	22-May	29-May	06-May	25	2.0	05-Jul
DP-73-4-51	928	75	6502	6.8	2.09	97.4	17-May	29-May	24-Apr	23	2.0	05-Jul
DP-233	909	74	6837	6.4	1.60	81.8	05-Jun	09-Jun	24-Apr	55	2.0	17-Jul
DP-26	857	70	5797	7.3	1.47	78.3	05-Jun	12-Jun	26-Apr	50	2.0	17-Jul
DP-78-9-20	792	64	6184	6.1	1.71	86.4	05-Jun	10-Jun	24-Apr	55	2.0	15-Jul
Pippin	475	39	5154	4.4	1.49	75.9	30-May	21-Jun	24-Apr	53	2.0	23-Jul
DP-79-2-48	449	36	6376	3.4	2.63	82.0	07-Jun	20-Jun	24-Apr	70	2.0	23-Jul
Trani	394	32	5416	3.4	1.61	82.1	10-Jun	26-Jun	24-Apr	58	2.0	23-Jul
Mean	1027	-	6701	7.3	2.05	90.4	26-May	06-Jun	26-Apr	41	2.0	-
LSD .05	234	-	1235	1.7	0.13	9.7	3 ²	4 ²	5 ²	22	NS	-

¹ Lodging score 1-5; 1 = no lodging and 5 = flat

² Days

Table 5. 1986 seed yield of fine leaf fescue varieties.

Variety Name	Seed Yield		Total Dry Weight	Harvest Index	1000 Seed wt.	Plant Height	Heading Date	Anthesis Date	First Lodging			Har- vest Date
									Date	Area	Severity ¹	
	(lb/a)	(%Std.)	(lb/a)	(%)	(g)	(cm)				(%)		
ISI-544 Cornet	1741	230	5957	14.0	1.36	72.6	03-Jun	24-May	26-Apr	33	2.3	23-Jun
ISI-829 Enzet	1449	192	6143	11.3	1.35	71.9	27-May	22-May	24-Apr	38	2.5	23-Jun
ISI-504 Fulda	1186	157	5968	9.8	1.38	71.6	03-Jun	24-May	01-May	33	2.5	23-Jun
Mom Frc 626	1097	145	5417	9.7	1.09	73.8	10-Jun	22-May	01-May	38	2.8	19-Jun
Cascade	1090	144	5615	9.4	1.13	89.0	17-Jun	29-May	01-May	28	2.0	23-Jun
Z 72 Frc 205	1036	137	4838	10.4	1.03	74.0	10-Jun	22-May	01-May	30	2.5	19-Jun
LW R75-2 (Furore)	806	107	5254	7.3	1.06	77.3	10-Jun	26-May	05-May	15	2.0	19-Jun
Pennlawn (Std.)	756	100	4616	7.8	1.01	80.3	24-Jun	29-May	08-May	28	2.0	23-Jun
Mean	1145	-	5476	10.0	1.17	76.3	09-Jun	24-May	01-May	30	2.3	-
LSD .05	114	-	892	1.7	0.04	5.7	2 ²	4 ²	3 ²	21	0.7	-

¹ Lodging score 1-5; 1 = no lodging and 5 = flat
² Days

Table 6. 1986 seed yield of bluegrass varieties.

Variety Name	Seed Yield		Total Dry Weight	Harvest Index	1000 Seed wt.	Plant Height	Heading Date	Anthesis Date	First Lodging			Harvest Date
									Date	Area	Severity ¹	
	(lb/a)	(%Std.)	(lb/a)	(%)	(g)	(cm)				(%)		
Newport (Std.)	1023	100	3953	12.3	0.383	71.1	01-May	22-May	05-Jun	18	2.0	01-Jul
ZW-42-116	803	78	3973	9.6	0.320	66.6	08-May	29-May	22-May	40	2.5	01-Jul
Nimbus	607	59	3500	8.3	0.355	63.1	15-May	29-May	05-Jun	33	2.5	01-Jul
Larissa	411	40	2145	9.2	0.378	49.1	24-Apr	15-May	05-Jun	43	2.8	01-Jul
Mean	711	-	3393	9.9	0.359	62.5	05-May	22-May	02-Jun	33	2.4	-
LSD .05	250	-	501	2.4	0.036	6.2	NS	NS	NS	23	NS	-

¹ Lodging score 1-5; 1 = no lodging and 5 = flat

Table 7. 1986 seed yield of orchardgrass varieties.

Variety Name	Seed Yield		Total Dry Weight	Harvest Index	1000 Seed wt.	Plant Height	Heading Date	Anthesis Date	First Lodging			Harvest Date
									Date	Area	Severity ¹	
	(lb/a)	(%Std.)	(lb/a)	(%)	(g)	(cm)				(%)		
Hallmark	1880	150	7578	12.0	1.09	147.3	08-May	29-May	05-Jun	55	3.0	23-Jun
Crown	1421	114	7518	9.2	1.11	155.1	15-May	29-May	22-May	58	2.8	27-Jun
Potomac (Std.)	1250	100	6481	9.3	1.12	145.4	15-May	29-May	22-May	53	3.3	27-Jun
Rancho	1096	88	5885	9.0	0.99	147.0	20-May	29-May	23-May	15	2.0	30-Jun
Cesarina	660	53	5365	5.9	0.85	124.9	15-May	29-May	22-May	83	3.8	08-Jul
Mean	1261	-	6565	9.1	1.03	143.9	15-May	29-May	25-May	53	3.0	-
LSD .05	251	-	869	2.0	0.07	5.6	2 ²	NS	2 ²	22	0.6	-

¹ Lodging score 1-5; 1 = no lodging and 5 = flat

² Days

Table 8. 1986 seed yield of tall fescue varieties.

Variety Name	Seed Yield		Total Dry Weight	Harvest Index	1000 Seed wt.	Plant Height	Heading Date	Anthesis Date	First Lodging			Harvest Date
									Date	Area	Severity ¹	
	(lb/a)	(%Std.)	(lb/a)	(%)	(g)	(cm)				(%)		
Rebel II	2551	118	8351	13.8	1.97	124.8	08-May	29-May	22-May	75	3.5	30-Jun
Rebel	2238	104	8049	12.9	2.17	132.4	08-May	03-Jun	22-May	68	3.0	30-Jun
Forager	2192	102	8374	11.8	2.63	145.0	17-Apr	29-May	15-May	78	2.0	19-Jun
Fawn (Std.)	2158	100	7918	12.5	2.56	135.7	17-Apr	29-May	15-May	68	2.0	19-Jun
Sibilla	1955	91	7859	11.3	2.02	141.6	08-May	31-May	22-May	78	3.8	30-Jun
Mean	2219	-	8110	12.5	2.27	135.9	30-Apr	30-May	19-May	73	2.9	-
LSD .05	377	-	NS	2.1	0.16	7.6	2 ²	4 ²	2 ²	NS	0.6	-

¹ Lodging score 1-5; 1 = no lodging and 5 = flat

² Days

Table 9. 1986 seed yield of Italian ryegrass varieties.

Variety Name	Seed Yield		Total Dry Weight	Harvest Index	1000 Seed wt.	Plant Height	Heading Date	Anthesis Date	First Lodging			Harvest Date
									Date	Area	Severity ¹	
	(lb/a)	(%Std.)	(lb/a)	(%)	(g)	(cm)				(%)		
Marshall (Std.)	2272	100	7136	14.7	2.86	159.2	27-May	03-Jun	26-Apr	43	2.8	02-Jul
Bambi	1440	63	6142	10.6	4.09	133.6	26-May	03-Jun	29-Apr	50	2.5	30-Jun
Sikem	1410	62	5363	12.0	2.58	140.0	24-May	02-Jun	28-Apr	40	2.5	30-Jun
Aubade	1327	58	7004	8.6	3.83	131.0	27-May	03-Jun	28-Apr	33	3.3	02-Jul
Westerwold	1262	56	5964	9.6	3.97	133.4	29-May	02-Jun	01-May	33	2.5	02-Jul
SI-4	1085	48	5820	8.4	2.99	123.5	24-Apr	15-May	24-Apr	50	2.8	19-Jun
Top 1	1076	47	5661	8.8	4.03	143.2	29-May	03-Jun	29-Apr	48	3.0	02-Jul
Wencke	1030	45	4801	9.7	2.54	137.0	24-May	02-Jun	29-Apr	45	3.0	30-Jun
Roberta	962	42	6245	7.0	4.00	129.7	24-May	03-Jun	28-Apr	40	2.5	02-Jul
WSG TB-1A	959	42	5810	7.5	3.66	143.2	27-May	03-Jun	01-May	38	2.5	30-Jun
Kitti	942	41	4877	8.8	2.41	125.5	22-May	29-May	28-Apr	48	3.0	30-Jun
Catalpa	872	38	5369	7.3	3.91	129.2	22-May	29-May	29-Apr	50	2.5	30-Jun
Mean	1220	-	5849	9.4	3.41	135.7	23-May	31-May	28-Apr	43	2.7	-
LSD .05	221	-	881	1.7	0.17	12.0	4 ²	5 ²	5 ²	NS	NS	-

¹ Lodging score 1-5; 1 = no lodging and 5 = flat

² Days

Table 10. Monthly mean temperature, total precipitation, in Corvallis, Oregon (30-yr averages, July, 1980 - June, 1981).

Month	Temperature (°F)						Precipitation (in)		
	Avg. Min		Departure from 30-yr. avg.	Avg. Max		Departure from 30-yr. avg.	Avg.		Departure from 30-yr. avg.
	30-yr avg.	1985- 86		30-yr avg.	1985- 86		30-yr avg.	1985- 86	
July	50.6	52.3	1.7	80.7	87.1	6.4	0.31	0.54	0.2
Aug.	50.7	50.0	-0.7	80.5	80.9	0.4	0.81	0.48	-0.3
Sept.	47.7	45.8	-1.9	75.5	71.6	-3.9	1.48	0.78	-0.7
Oct.	41.7	40.6	-1.1	64.3	63.8	-0.5	3.39	3.89	0.5
Nov.	37.2	31.5	-5.7	52.3	44.8	-7.5	6.17	4.69	-1.5
Dec.	34.6	25.5	-9.1	46.5	40.1	-6.4	7.77	3.72	-4.1
Jan.	32.9	35.8	2.9	45.1	49.6	4.5	7.55	6.53	-1.0
Feb.	35.0	37.4	2.4	50.4	50.0	-0.4	4.86	9.90	5.0
Mar.	36.1	41.7	5.6	53.8	60.2	6.4	4.63	3.04	-1.6
Apr.	38.8	39.3	0.5	59.3	59.2	-0.1	2.46	1.84	-0.6
May	43.2	44.5	1.3	66.2	65.7	-0.5	1.92	2.50	0.6
June	48.3	51.2	2.9	72.6	77.4	4.8	1.20	0.31	-0.9
Year	41.4	41.3	-0.1	62.3	62.5	0.2	42.55	38.22	-4.3

From Redmond, 1986

REFERENCES

Redmond, K.T. 1986. Local climatological data for Corvallis, Oregon. 1985 summary with normals, means, extremes, monthly time series. Agric. Expt. Sta., Oregon State University in cooperation with Office of the State Climatologist, Climatic Research Institute. Spec. Rept. 777. 23 pp.

Youngberg, H.W., W.C. Young, and D.O. Chilcote. 1985. Oregon Forage and Turf Grass Variety Seed Yield Trial, 1982-83. Agricultural Experiment Station, Oregon State University, Corvallis, Special Report 730. February 1985. 11p.

Youngberg, H.W., W.C. Young, and D.O. Chilcote. 1986. Oregon Forage and Turf Grass Variety Seed Yield Trial, 1984-85. Agricultural Experiment Station, Oregon State University, Corvallis, Special Report 766. April 1986. 15 pp.