

FORAGE VARIETAL ADAPTATION EXPERIMENT

The demand for information on the adaptation of grass and legume species under dryland and irrigation has made necessary the establishment of several nurseries in the Central Oregon area.

The trials have been established in randomized block design with three replications. Each plot is 6 x 20 feet. Under dryland the plot is planted to 6 rows, one foot apart, and on irrigated trials the seedings are broadcast.

The purpose in establishing the nurseries was to gain information on longevity of stand, general growth habits and productivity as determined by observation.

Two nurseries have been established under typical irrigation conditions, three trials under dryland, and one nursery under more or less meadow conditions.

For the irrigation forage varietal nurseries, stand notes are on the following basis:

- 0 - No stand
- T - Trace
- 1 - Thin stand
- 2 - Average (adequate) stand
- 3 - Better than average stand

The dryland nurseries are indicated in different methods and will be described in the individual nurseries.

Irrigated Forage Nurseries

Willows Ranch Forage Nursery

The Williams ranch nursery is located approximately one mile north of Sisters in an old meadow which was being developed into an improved pasture. The soil is principally pumice but with a higher organic matter than most Central Oregon soils. The area in which the trial was planted sloped toward a creek with the first replication being farthest from the creek.

When the area was seeded May 10, 1950, it was obvious that there was a considerable range in organic matter and moisture in the soil, with the first replication being somewhat similar to the dryland areas and the third replication considerably more moist and higher in organic matter.

The rancher planned to divert part of the creek flow and to irrigate during the late spring and summer when water was available. Not knowing the flow of water available, grasses were included which varied from strictly dryland species to wet land species such as Reed canary grass and Meadow foxtail. A mixture of Alsike and Ladino clover was broadcast seeded in all but the legume plots.

Table No. 72  
 Forage Varietal Adaptation Nurseries  
 Irrigated Forage Nursery  
 Willows Ranch, Sisters, Oregon  
 Seeded May 10, 1950

Common Name	Botanical Name	Pedigree	Stand by (1) Replication		
			1	2	3
Smooth bromegrass	<i>Bromus inermis</i>	Fischer	0	T	0
Smooth bromegrass	<i>Bromus inermis</i>	Neb. 36	1	0	0
Smooth bromegrass	<i>Bromus inermis</i>	Neb. 44	1	0	0
Smooth bromegrass	<i>Bromus inermis</i>	Lincoln	0	0	0
Smooth bromegrass	<i>Bromus inermis</i>	Sandberg	1	0	0
Smooth bromegrass	<i>Bromus inermis</i>	Achenback	1	1	0
Smooth bromegrass	<i>Bromus inermis</i>	Manchar	1	1	0
Smooth bromegrass	<i>Bromus inermis</i>	Utah-12	0	T	0
Smooth bromegrass	<i>Bromus inermis</i>	Kuhl-Ore.	0	0	0
Orchard grass	<i>Dactylis Glomerata</i>	233	0	0	0
Orchard grass	<i>Dactylis Glomerata</i>	S-143	0	0	0
Reed canary grass	<i>Phalaris arundinacea</i>		3	3	3
Tualatin tall oatgrass	<i>Arrhenatherum elatius</i>		0	0	0
Meadow foxtail	<i>Alopecurus pratensis</i>	Comm	2	T	3
Meadow foxtail	<i>Alopecurus pratensis</i>	Creeping	3	3	3
Burnet	<i>Sanguisorba minor</i>		0	0	0
Creeping alfalfa			0	0	0
Timothy	<i>Phleum pratense</i>	Cornell	3	3	3
Western wheatgrass	<i>Agropyron smithii</i>	Utah 52-2	0	0	0
Canada wild rye	<i>Elmus canadensis</i>		0	0	0
Tall fescue	<i>Festuca elatior</i> var. <i>arundinacea</i>		2	2	2
Ranier red fescue	<i>Festuca rubra</i>		3	3	0
Chewings fescue	<i>Festuca rubra</i> var. <i>commutata</i>		3	1	0
Alta fescue	<i>Festuca elatior</i> var. <i>arundinacea</i>		1	3	0
Ree Wheatgrass	<i>Agropyron intermedium</i>		0	0	0
Intermediate wheatgrass	<i>Agropyron intermedium</i>	Nebr. 50	0	0	0
Burning brush	<i>Kochia scoparia</i>		*		

\*One replication seeded - Burning Brush is an annual and did not reseed.

(1) No perceptible change in stand during 1953

1954 - Reed canary grass, meadow foxtail, and Cornell timothy predominant species.

Notes taken during the summer after seeding indicated a good stand of all grasses and legumes was obtained. The farmer found, however, that it was impossible to control the water in the nursery area. Consequently, from fall of 1950 to late spring of 1952 the third replication of the nursery was under water most of the time and replications one and two received too much water for all of the dryland species and some of the species adapted to irrigation.

Therefore, western wheatgrass, intermediate wheatgrass, burning brush, creeping alfalfa, and Canada wild rye killed out entirely, while smooth bromegrass, orchard grass, and Tualatin tall oatgrass either failed to survive or only very light stands remained. (See Table No. 72.)

Rainier red fescue, chewings fescue, and alta fescue remained in replication one and two. Reed canary grass, the meadow foxtails, Cornell timothy, and tall fescue survived in all three replications.

Considering the treatment, the clovers grew very well with alsike in the predominance.

Notes taken during 1953 indicate that the nursery area was grazed regularly and that no perceptible change in stand was observed.

The nursery was visited June 26, 1954, and at that time the nursery was still under water. Some Ladino and alsike clover remained principally on the high spots. All of the bromegrass and orchard grass species have died out; meadow fixtail is spreading rapidly. Reed canary grass is spreading and growing exceptionally well. The spread of Reed canary grass is slower than meadow foxtail but is much denser. Cornell timothy is thriving but not spreading perceptibly where it is entirely under water.

Meadow foxtail appears to be taking over the entire nursery except in the Reed canary and Cornell timothy plots.

Some rushes and sedges are coming into the nursery area.

The grasses seeded and the stand as of 1952 are shown in Table No. 72 .

Campbell (Livingston) Forage Nursery

This nursery was abandoned during 1954. The varieties grown in this nursery can be found in the 1953 annual report. The nursery contained one or more varieties of tall fescue, chewings fescue, red fescue, smooth bromegrass, timothy, meadow foxtail, tall oatgrass, creeping alfalfa, orchard grass, Highland bentgrass, and perennial ryegrass. By the summer of 1954, only the tall fescues, red fescue, chewings fescue, and meadow foxtails were still productive. As mentioned in previous reports, this nursery has been overpastured and underfertilized to the point that only the very hardy have survived.

Gladwill Irrigated Forage Nursery

The nursery was located on the G. W. Gladwill farm 2½ miles east of Culver. The trial was seeded in April, 1950, on a rather shallow, rocky Lamonta sandy loam.

The pasture has received some nitrogen each year and while the pasturing has been close and continuous, it has not been as vigorous as at the Campbell location.

Table No. 73 presents the "Vigor Ratings" for 1952 and 1954. There were no observable changes in 1953.

The Vigor Rating is the product of one of four stand classes multiplied by one of three productivity classes resulting in a Vigor Rating of from 0-12. Stand was rated as:

- 1 - poor
- 2 - fair
- 3 - average
- 4 - superior

Productivity was rated as:

- 1 - poor
- 2 - average
- 3 - superior

The vigor ratings tend to point out the productive longlived species of forage, but it fails to indicate which portion is productivity and which portion is stand. The 1954 stands are also included.

The 1954 results indicate that of the tall fescues included in the nursery, Alta and K-31 are superior to Goar and the unimproved tall fescue. All strains are improving in stand.

Chewings fescue, red fescue and Highland bent grass have maintained good stands but are low producing species.

The smooth bromegrasses in the nursery, Achenback, Manchar and Kuhl, are not adapted to irrigated pasture use in central Oregon. Of the three, Manchar is the best.

Common, Lorraine and Cornell timothy were included in this nursery. All were superior in 1952, but common and Lorraine are deteriorating, while Cornell remains a good productive stand.

P-3, and Oregon 12 meadow foxtail are gradually dying out of the nursery. This is very unusual in light of the performance of meadow foxtail in the other two irrigated nurseries.

Tualatin tall oatgrass has died out.

Nomad and Rhizoma alfalfa are maintaining excellent stands but are not productive. Orchard grass Sel. 233 is improving while standard is deteriorating.

At the time of the observation, Alta and K-31 fescue, Cornell timothy, and Orchard grass Sel. 233 were the outstanding varieties in this nursery.

Table No. 73  
 Forage Varietal Adaptation Nurseries  
 Irrigated Forage Nursery  
 G. W. Gladwill Farm - Culver, Oregon  
 Seeded April, 1950

Common Name	Botanical Name	Variety or Pedigree	Vigor Rating		Stand 1954
			1952	1954	
Tall fescue	Festuca elatior var. arundinaceae		4	9	3
Chewings fescue	Festuca rubra var. commutata		6	8	4
Tall fescue	Festuca elatior var. arundinaceae	Alta	12	12	4
Tall fescue	" " " "	Goar	3	4	2
Tall fescue	" " " "	K-31	12	12	4
Red fescue	Festuca rubra	Rainier	4	4	4
Smooth bromegrass	Bromus inermis	Achenback	1	1	1
Smooth bromegrass	" "	Manchar	1	4	2
Smooth bromegrass	" "	Kuhl	2	2	1
Timothy	Phleum pratense	Common	12	6	2
Timothy	" "	Lorrain	8	4	2
Timothy	" "	Cornell	12	12	4
Meadow foxtail	Alopecurus pratensis	P-3	9	4	2
Meadow foxtail	" "	Ore.12	4	2	1
Tall oatgrass	Arrhenatherum elatius	Tualatin	6	0	0
Creeching alfalfa		Nomad	4	4	4
Creeching alfalfa		Rhizoma	4	4	4
Orchard grass	Dactylis glomerata	Sel. 233	6	12	4
Highland bent	Agrostis tenuis		3	3	3
Perennial ryegrass	Lolium perenne	Oregon	9	8	4
Orchard grass	Dactylis glomerata	P.I.109012	9	6	2

Vigor rating established by multiplying stand by relative productivity.  
 Stand divided into 4 classes 1- poor 2- fair 3- average 4- superior  
 Productivity divided into 3 classes 1- poor 2- average 3- superior

## Dryland Forage Nurseries

### Grizzly Forage Nursery

Location and seeding details for this nursery may be found in the 1953 annual report of the Central Oregon Experimental Area.

Table No. 74 presents the varieties grown and the vigor ratings for 1951, 1952, 1953, and 1954. The varieties have been rated on the following basis:

- 0 - poor
- 1 - fair
- 2 - good
- 3 - excellent

The varieties were rated during 1954 by H. H. Ramptom of the Oregon State College Farm Crops Department, and the varieties grouped according to stand and vigor from 1-10, with 10 being highest in stand and vigor.

Comparing the two methods, it is possible to get a cleaner picture of the varieties when rated from 1-10 than when rated from 0-3. However, the better varieties can be identified in either system.

The ratings of the varieties are shown in Table No. . The ratings indicate that the outstanding varieties in the nursery are tall wheatgrass, Pubescent wheatgrass, Primer slender wheatgrass, and intermediate wheatgrass.

Western wheatgrass, Whitman beardless wheatgrass, sheep fescue, Sherman big bluegrass, Crested wheatgrass P.I. 109012 are in an intermediate group.

Standard crested wheatgrass, weeping lovegrass, the milk vetches, Manchar smooth brome grass, Mandan wild rye, Feather bunchgrass, meadow brome grass were not adapted to this location.

### Circle Ranch Forage Nursery

The nursery is on the Circle ranch approximately 7 miles north of Prineville. The soil has tentatively been described as a Lamonta fine sandy loam. The precipitation in this area is in the 8-10 inch range. A legal description of the trial area can be obtained in the 1953 annual report.

Apparently a good stand was initially obtained on most species. However, cattle were turned in the pasture and the nursery was chosen as a bedding ground by the cattle. As a result, some of the varieties were severely damaged.

The varieties sowed and the stand as of November, 1954, are shown in Table No. 75. It is apparent from the stand notes that the tall wheatgrasses, pubescent wheatgrasses, Siberian wheatgrass and standard intermediate wheatgrass are the grasses most able to withstand punishment the year of establishment.

It is planned to replant those varieties which did not become established in the early spring of 1955.

Table No. 74  
 Forage Varietal Adaptation Nurseries  
 Dryland Forage Nursery  
 Morrow Brothers Ranch - Grizzly, Oregon  
 Seeded March 26, 1950

Common Name	Botanical Name	Pedigree	Varietal Vigor Ratings				(1) *
			1951	1952	1953	1954	
Crested wheatgrass	Agropyron cristatum	Comm	1	1	1	1	2.3
Weeping lovegrass	Eragrostis curuula		0	0	0	0	1-
Intermediate wheatgrass	Agropyron intermedium	Ree	2	2	2	3	7
Western wheatgrass	Agropyron smithii		1	1	1	2	5.3
Primar slender wheatgrass	Agropyron trachycaulum		2	2	2	3	7.3
Whitmar beardless wheatgrass	Agropyron inerme		2	2	2	2	6.3
Sheep fescue	Festuca ovina		2(2)	2(2)	2(2)	2(2)	6.0
Milk vetch	Astragalus glycophylus	P.I. 123422	0	0	0	0	1.0
Smooth bromegrass	Bromus inermus	Manchar	1	1	1	1	4.0
Chickpea milk vetch	Astragalus cicer	P.I. 133148	0	0	0	0	1.0
Sherman big bluegrass	Poa ampla		3	2	2	2	6.3
Sicklepod milk vetch	Astragalus falcatus		0	0	0	0	1-
Mandan wild rye	Elymus canadensis var. mandan	#419	0	1	1	0	1.0
Feather bunchgrass	Stipa viridula	#397	0	1	1	0	1-
Meadow bromegrass	Bromus erectus	P.I. 89820-1	1	1	1	1	4.3
Pubescent wheatgrass	Agropyron trichophorum	P.I. 107328	3	3	3	3	7.3
Tall wheatgrass	Agropyron elongatum	P.I. 109452	3	3	3	3	8.3
Crested wheatgrass	Agropyron cristatum	P.I. 109012	2	3	3	3	5.6
Primar slender wheatgrass	Agropyron trachycaulum		2	2	2	3	6.0

(1) Ratings for 1951, 1952 and 1953 and 1954

0 = Poor, probably not adaptable

1 = Fair

2 = Good

3 = Excellent

\*Ratings given varieties by H. H. Rampton

1 = very poor

10 = excellent stand and production

(2) Excellent stand - low production

Table No. 75  
 Forage Varietal Adaptation Nurseries  
 Dryland Forage Nursery  
 Circle Ranch - Prineville, Oregon  
 Seeded October 31, 1953

Common Name	Botanical Name	Pedigree	Stand <sup>(1)</sup> by Replication		
			1	2	3
Pubescent wheatgrass	<i>Agropyron trichophorum</i>	Utah 109	0	2	3
Pubescent wheatgrass	" "	A 1488	2	3	3
Pubescent wheatgrass	" "	P41	0	1	2
Pubescent wheatgrass	" "	Comm.	2	3	0
Intermediate wheatgrass	<i>Agropyron intermedium</i>	Neb. 50	1	1	0
Intermediate wheatgrass	" "	M2-10820	0	0	0
Intermediate wheatgrass	" "	A12496	2	2	1
Ree wheatgrass	" "		1	0	3
Intermediate wheatgrass	" "	Comm	3	3	1
Hard fescue	<i>Festuca ovina</i> var. <i>duriuscula</i>	P2517	0	0	0
Sheep fescue	<i>Festuca ovina</i>	F274	0	0	0
Sheep fescue	" "		0	0	0
Sherman big bluegrass	<i>Poa ampla</i>		0	0	0
Mandan ricegrass	<i>Stiporyzopsis</i>		0	0	0
Tall wheatgrass	<i>Agropyron elongatum</i>	P2326	3	3	3
Tall wheatgrass	" "		3	2	3
Whitman beardless wheatgrass	<i>Agropyron inerme</i>		0	1	2
Crested wheatgrass	<i>Agropyron desertorum</i>	Comm	0	1	0
Crested wheatgrass	<i>Agropyron desertorum</i>	A1770	0	0	2
Fairway crested wheatgrass	<i>Agropyron cristatum</i>		0	0	0
Desert wheatgrass	<i>Agropyron desertorum</i>	42-1	T	2	3
Desert wheatgrass	" "	Neb. 10	0	0	2
Desert wheatgrass	" "	571	1	0	0
Siberian wheatgrass	<i>Agropyron sibiricum</i>	P27	2	3	3
Smooth bromegrass	<i>Bromus inermis</i>	Manchar	0	0	0

(1) Stand on November 17, 1954

- 0 - No stand
- 1 - Poor stand
- 2 - Average stand
- 3 - Above average

Steelhammer Forage Nursery

The Steelhammer nursery was abandoned during the spring of 1954. Of the eighteen varieties seeded and established in 1950, only three varieties, Pubescent wheatgrass P.I.107328, tall wheatgrass P.I.109452, and crested wheatgrass P.I.109012, maintained good stands until the spring of 1954. Primer slender wheatgrass were still present but were weakening.

The varieties seeded in this nursery were identical to the varieties in the Grizzly nursery except that the last Primer slender wheatgrass variety was not included in the Steelhammer nursery.

Summary

Under dryland range conditions of the nurseries established, it appears that tall wheatgrass, pubescent wheatgrass, Primer slender wheatgrass, Whitman beardless wheatgrass, crested wheatgrass P.I.109012, and Sherman big bluegrass are the most easy and productive.

Apparently under dry pumice soils, this group narrows to tall wheatgrass, pubescent wheatgrass and crested wheatgrass 109012.

Standard crested wheatgrass has not performed well in any dryland nursery established.