TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE Portland, Oregon SOIL CONSERVATION SERVICE

Plant Materials Technical Note No. 8 March 1989

PERFORMANCE OF 'COVER' SHEEP FESCUE IN WASHINGTON AND OREGON 1964 TO 1981

INTRODUCTION

Covar sheep fescue (Festuca ovina) is a dwarf, blue-green densely tufted, erect-growing, perennial bunchgrass. It was introduced from Turkey, and has been evaluated in the Plant Materials program since the mid-1930's. Trial plantings in Washington, Oregon, and Idaho show it to be an aggressive competitor that forms an attractive, drought-tolerant, erosion control cover. Covar is somewhat slow to establish; but, once established, is persistent and winter-hardy.

Covar has been tested in 40 field plantings in eastern Washington and eastern Oregon since 1964 (see Appendix 1). Two plantings have recently been made in western Oregon, but data are not yet available. Plantings have been made in Major Land Resource Areas (MLRA) 2, 3, 5, 6, 7, 8, 9, 10, 11, 43 and 44.[1/] Precipitation ranged from less than 10 inches to about 40 inches. Soils varied from fine sands to silt loams, to gravelly silt loams; and many were on subsoils. Sites were generally of low fertility and nonproductive; Covar was developed primarily for erosion control and not forage production.

USE RATINGS

Covar is recommended for erosion control in low precipitation areas where low maintenance groundcover is desired. Field plantings were established with this intent and evaluated under the following uses:

LAND-USE	NUMBER OF PLANTINGS	PERFORMANCE[2/] RATING	SITE SEVERITY[2/] INDEX
roadside	11	53	40
critical area[3/]	9	50	40
orchard cover-crop	7	90	75
pond bank	3	67	55
wildlife	2	62	60
racetrack	1	0	30
rangeland understory	1	75	70
ski-slope	1	0	70
streambank	1	75	50
turf	1	no data	55
waterway	1	no data	60

1/ 1981. Land Resource Regions and Major Land Resource Areas of the United States. USDA-SCS. AH 296. Wash. D.C.

2/ See Appendix 2 for description of rating system and site severity index

3/ Unspecified use. Could have been any of the others listed here.

Covar generally performed at or above site severity indices assigned for each land-use. A performance rating for land-use with fewer than three plantings should be discounted since there is too little data to place confidence in the rating.

Sufficient data were gathered only for the first four uses in the list involving thirty plantings. In all four of these uses, Covar performance exceeded that needed to provide adequate erosion control in relation to the severity of the site.

The racetrack and ski-slope USE plantings were both failures; but, again, only one planting each was made and no confidence can be placed in those results. No performance data were returned on the turf or waterway plantings.

MLRA RATINGS

Covar field plantings were made in nine MLRA's in eastern Washington and Oregon. A single planting in MLRA 3, Olympic and Cascade Mountains, was made on the eastern slopes of the Cascade Mountains at the Bachelor Mountain ski resort. The largest number of plantings were made in MLRA's 7, 8 and 44 in the Columbia Basin, Columbia Plateau, and Northern Rocky Mountain valleys, respectively. Performance was generally fair to good in most MLRA's. The best performance was in the MLRA 44 Northern Rocky Mountain foothills. Site severity indices were not made for MLRA as was done for USES.

MLRA	NO. PLANTINGS	PERFORMANCE RATING
3	1	0
6	1	no data
7	6	44
8	13	69
9	3	13
10	4	50
11	1	50
43	4	38
44	7	83

The relationships between performance ratings and MLRA are variable and uncertain. The low performance rating of the three plantings in MLRA 9, Palouse and Nez Perce Prairies, is inconsistent with earlier evaluations conducted at the Pullman PMC, where Covar performed very well. Relating plant performance to MLRA may be inappropriate in this case, in view of the disturbed nature of most sites where Covar is used.

PRECIPITATION RATINGS

Covar field plantings were made in precipitation zones ranging from less than 10 to 40 acre-inches annually. Performance was generally fair to good in the lower precipitation zones where the plantings were concentrated. This confirmed the drought-tolerant characteristics of Covar. The planting site with the lowest recorded long-term precipitation data is at Moxee, Washington, with 8.51 inches annually, where Covar has an excellent performance rating in a trickle-tube irrigated orchard.

PPT. ZONE	NO. PLANTINGS	PERFORMANCE RATING
<10"	12	63
10 - 15"	12	53
16 - 20"	12	60
21 - 30"	1	75
31 - 40"	2	38

SOIL RATINGS

Covar field plantings have been made on a variety of soil series and soil textures as well as unknown materials on disturbed or constructed sites. Soil information is unavailable from about 20 percent of the plantings. Plantings were all on coarse and medium textures; no fine-textured soils were planted. Covar showed better performance on the coarser texture classes.

SOIL	TEXTURE	NO. PLANTINGS	PERFORMANCE RATING
Quincy	fine sand	1	25
Bisbee	loamy fine sand	1	75
unknown	sandy loan	1	75
Springdale	gravelly sandy loam	1	no data
Warden	very fine sandy loam	1	100
Hutchinson	loam	1	100
Garrison	gravelly stony loam	1	100
Green Bluff	silt loam	2	88
Goodrich	silt loam	1	75
Morrow	silt loam	1	50
Renslow	silt loam	1	75
Ritzville	silt loam	3	58
Walla Walla	silt loam	1	no data
Colockum	cobbly silt loam	1	75
Bakeoven	stony silt loam	1	75
Catherine	silty clay loam	1	0

OVERALL PERFORMANCE

Covar was evaluated in 40 field plantings over a 20-year period on a variety of sites under different conditions and uses. Overall performance has been good. Adaptation to droughty, infertile critical areas with coarse to medium textured soils and wide temperature extremes has been demonstrated. Covar can be expected to contribute measurably to controlling erosion under these conditions.

OVERALL PLANT PERFORMANCE	NUMBER OF PLANTINGS	PERCENT OF PLANTINGS
Execellent	7	17
Good	10	25
Fair	3	8
Poor	2	5
Failure	7	17
No data	11	28

APPENDIX 1
COVAR SHEEP FESCUE FIELD PLANTING PERFORMANCE
1964 - 1981, IN WASHINGTON AND OREGON

YEAR	LOCATION	MLRA	PPT	SOIL	USE	PERFORMANCE	FP NO.
1964	Arlington OR	8	10	Ritzville	Roadside	Failure	1392
1965	Wilson Creek WA	8	< 10	Various	Roadside	EX	1464
1966	Mead WA	44	17	Green Bluff	Orchard c.c.	EX	1486
1967	E. Wenatchee WA	8	10			Not Planted	1551
1968	PendOrielle Co. WA	44	40	Mixed	Earth Dam	Good	1609
1968	Warden WA	7	< 10		Critical Area	No data	1611
1969	Republic WA	43	17	Unknown	Roadside	Failure	1615
1970	Naches WA	8	12	Sandy Loam	Critical Area	Good	1699
1971	Keating OR	10	12	Unknown	Wildlife	EX	1710
1972	Moses Lake WA	7	< 10	Quincy	Wildlife	Poor	1748
1972	Heppner OR	8	14	Morrow	Critical Area	Fair	1756
1972	La Grande OR	10	20	Catherine	Roadside	Failure	1765
1972	Pullman WA	9	20	Subsoil	Critical Area	Poor	1766
1972	Colville WA	44	15	Bisbee	Roadside	Good	1771
1972	Othello WA	7	< 10	Unknown	Race Track	Failure	1774
1973	Mose Lake WA	7	< 10	Unknown	Critical Area	No data	1785
1973	Winchester ID	43	20		Roadside	No data	1788
1973	Pullman WA	9	20	Subsoil	Critical Area	No data	1800
1973	Baker OR	43	15	Goodrich	Pond bank	Good	1806
1973	Harrington WA	8	12	Ritzville	Roadside	Good	1821
1974	Republic WA	43	17		Critical Area	No data	1868
1976	Spokane WA	44	17	Springdale	Orchard	No data	W-8-77
1976	Mead WA	44	17	Green Bluff	Orchard	Good	W-11-77
1978	Newport WA	44	30	Unknown	Roadside	Good	W-8-78
1978	Goldendale WA	8	18	Renslow	Range	Good	W-10-78
1978	Davenport WA	8	15		Roadside	No data	W-15-78
1978	Spokane WA	44	17	Garrison	Roadside	EX	W-21-78
1978	La Grande OR	10	20	Hutchinson	Critical Area	EX	O-20-78
1978	Moro OR	8	10	Walla Walla	Waterway	No data	O-23-78
1979	Wenatchee WA	8	< 10	Colockum	Orchard	Good	W-14-79
1979	Wenatchee WA	8	< 10		Orchard	No data	W-15-79
1979	Prosser WA	7	< 10	Mixed	Roadside	Fair	W-18-79
1979	Prosser WA	7	< 10	Warden	Orchard	EX	W-19-79
1979	Ontario OR	11	< 10	Mixed	Pond bank	Fair	O-4-79
1979	Redmond OR	6	< 10		Turf	No data	O-8-79
1979	Redmond OR	3	35	Unknown	Ski slope	Failure	O-13-79
1980	Moxee WA	8	< 10	Ritzville	Orchard	EX	W-3-80
1980	Waterville WA	8	10	Bakeoven	Streambank	Good	W-16-80
1980	Clarkston WA	9	15	Unknown		Failure	W-18-80
1981	Fossil OR	10	15	Unknown	Critical Area	Failure	O-12-81

APPENDIX 2
RATING SYSTEM AND SITE SEVERITY INDEX

The SCS Plant Materials program uses different rating systems to evaluate the performance of plants being tested. Rating systems are used to provide simple and rapid means of making comparative evaluations among a number of similar items. They are generally abstract and expressed in words or numbers on a finite scale. The rating systems used in this report are of both kinds.

The performance rating system is based on a judgement of the overall performance of a particular field planting (Appendix 1). This performance is then assigned a numerical value:

excellent = 4
good = 3
fair = 2
poor = 1
failure = 0

This, in turn, is converted into a percentage value of the highest possible performance by:

$$\frac{\text{numerical value}}{4} \times 100 = \text{performance rating}$$

Numerical ratings can then be used to compare performances of plantings in different MLRA, precipitation zones, uses, soils, etc.

Numeric ratings are also used in this report to compare Covar's performance against a site severity index for each of several uses where it was planted. The site severity index is also expressed as a percentage. Site severity is determined by assigning numerical values to five site factors which affect plant growth:

1. Soil	
Topsoil	3
Mixed	2
Subsoil	1

2. Fertility	
Fertilized Topsoil	4
Unfertilized Topsoil	3
Fertilized Subsoil	2
Unfertilized Subsoil	1

3. Moisture Availability	
Full Season	5
High	4
Moderate	3
Low	2
Very Low	1

4. Traffic	
None	4
Light	3
Moderate	2
Heavy	1

5. Erosion Potential	
Slight	5
Moderate	4
Moderately severe	3
Severe	2
Very severe	1

The first four factors are determined by judgement and site evaluation. The fifth, erosion potential, is determined empirically using the USLE and/or WEQ and calculating the ratio of average annual erosion rates (A) to soil loss tolerance (T).

The numerical values of each site factor are totaled and then converted into a percentage value of the best possible site conditions:

$$\frac{S + F + M + T + E}{21} \times 100 = \text{site severity index}$$

This method dictates that a site with a high numerical index should have a high potential for plant growth, whereas a site with a low index should have a low potential for plant growth.

Since both the plant performance ratings and the site severity indices are expressed as percentages of their maximum potentials, the two can be compared. This was done in this report to compare Covar performance under 10 different use sites. Where Covar equals or exceeds the site index, the probability of the vegetation achieving its maximum performance on that site is obtained.