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Reseeding Semiarid Rangeland

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The grazing capacity of large areas of semiarid rangeland in the Intermountain West can be increased as much as 4 to 20 times. To make this possible, these areas must be reseeded to range grasses. Good seedbeds, seeding with the right equipment, seeding at the right time, and using well-adapted grasses are required.

How to prepare land, how to seed, when to seed, and what plants to use were determined in an 8-year study near Aberdeen, Idaho. A team of scientists from the Soil Conservation Service and the cooperating Aberdeen Branch Experiment Station did the work.

The study site was rangeland typical of large areas in the Intermountain West. The soil was shallow and low in organic matter. Soils of this kind are dry at least half of the year. However, they are usually moist at depths from 4 to 12 inches for a continuous period equal to one-fourth of the time that soil temperature at 20 inches exceeds 41° F.

This is a sagebrush-grassland area with an average precipitation of 8.79 inches per year. This average was reached only 1 year during this study. In some years precipitation was 25 percent below average.

The results of this study apply to large areas of southern Idaho, southwestern Oregon, northwestern Utah and northern Nevada. The exact area is mapped as R-1 in USDA Agricultural Handbook 339.

How to Prepare the Land

The most intensive methods should be used to prepare this kind of land for reseeding. Intensive methods may cost more, but they insure good establishment, earlier grazing readiness and higher yields per acre.

Summer fallow is superior to all other methods. The stands establish quickly, grazing readiness is advanced by at least 1 year and competition from invading perennial weeds and shrubs is delayed. A simple plowing in the spring before cheatgrass heads, followed by one or two rod weedings, is all that is required.

Heavy disking in the fall just before seeding is the second-best method of land preparation. It has application where the land cannot be plowed. A good rain following disking will settle the soil before planting.

Accidental burns occur on rangeland. Seedings can be successful if there is a good ash layer on the ground and rains soon follow. Sagebrush and rabbitbrush often invade these seedings. Seedings on burned land reach grazing readiness 1 year later than on fallow.

Seedings made directly into rangeland without any land preparation have a high hazard of failure. The initial cost is low but poor stands, low yields and greatly retarded grazing readiness offset the low initial cost.

The effect of different methods of land preparation on stand, rate of development, date of grazing readiness and yield are shown in Table 1. Land reaches grazing readiness when it yields at least 300 pounds per acre.

The table shows that the best results were on land that was fallowed. The poorest results were obtained when there was no land preparation. Plantings made on cultivated and burned-over land were slower to develop to full production, reached grazing readiness later and were lower in average yield than those on fallow.

How to Seed

Drilling the seed was better than broadcasting, even on fallow land. The deep-furrow-press drill gave consistently good results on all types of seedbeds. The double disk drill proved nearly as effective on fallow and cultivated land. Broadcasting gave poor results that were inferior in yield even when they reached full production.

Table 2 shows the results obtained with five methods of seeding. Notice the good result obtained when the crested wheatgrass mixture was seeded in alternate rows with winter wheat. This method of establishing seedings on range land produced yields equal to those that were drilled. It has special application to areas where wind or water erosion are a hazard to range seedings.

When to Seed

Late fall seedings gave the best results. They were made soon after Oct. 15, just before the soil was frozen. If there was no effective rainfall before this date, the seed was planted in the dust. It then germinated in the early spring when moisture and temperature were favorable.

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Late fall seedings produced better stands, yielded more and reached grazing readiness at least 1 year sooner than spring seedlings on fallow and cultivated land and 2 years sooner on burned-over land and where no preparation was used.

The average yield of the crested wheatgrass mixture from 5 years of planting on fallow and all years of harvest was 780 pounds per acre when seeded in the fall and 540 pounds per acre when seeded in the spring.

Climatic conditions, especially rainfall, were too limiting for the second grass mixture, using Whitmar beardless wheatgrass. Average yield of this mixture was only 252 pounds on fall plantings, 149 pounds on spring plantings. Fall plantings reached grazing readiness 2 years later than the crested wheatgrass mixture.

What to Seed

Which is better—to seed pure stands of grass, a mixture of grasses or a mixture of grasses and a legume? These questions were common in the early days of reseeding rangeland.

Mixed seedings were believed to have one or more of these advantages: higher yields of forage, longer grazing seasons, suppression of invading perennial weeds and brush and a better ground cover to protect the soil against erosion.

Mixed seedings and pure stands were used in this study. Two mixtures were planted on all seedbeds in the fall and spring for 5 years. Yields and basal densities (percent of ground cover) were taken each year after the stands were 3 years old. One mixture contained crested wheatgrass, Sodar wheatgrass and Sandberg bluegrass. The other mixture contained Whitmar wheatgrass, Sodar wheatgrass and Sandberg bluegrass.

Table 1. Effect of methods of land preparation on initial stands, rate of development, date of grazing readiness and average yield of the crested wheatgrass mixture. Data are the average of 5 seedings.

Age of Stand	Type of Seedbed				
	None	Early burn	Late burn	Cultivated	Fallow
yrs.	lb./A	lb./A	lb./A	lb./A	lb./A
3	81	244	141	224	443
4	235	381	275	418	891
5	325	501	428	579	937
6	443	691	673	658	873
7	708	897	928	1190	1575
8	699	572	853	1070	472
Average	317	473	402	530	780

Table 2. Average production of the crested wheatgrass mixture as affected by method of seeding and age of stand. Seedings made in the fall on fallow. Data are the average of 5 years of seeding.

Seeding Methods	Age of years in stand from planting						Ave.
	3	4	5	6	7	8	
	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Deep-furrow-press	572	891	938	873	788	472	798
Double disk	524	730	813	835	765	408	707
Broadcast	285	563	745	767	748	476	591
Alternate row with wheat	581	810	836	1081	849	445	798
Seeded in wheat stubble	17	168	299	464	647	576	281

Fourteen grasses were planted in pure stands in the fall on fallow. Eight were named varieties, four were numbered accessions and two were commercial species.

Three wheatgrasses in pure stands gave the highest yield of forage and were the most consistent in production among years. They were Siberian wheatgrass P-27, standard crested wheatgrass and Fairway crested wheatgrass. The average production from these three grasses was 924, 829 and 758 pounds of forage per acre, respectively.

Siberian wheatgrass P-27 gave the highest yield, developed a better ground cover, stayed green longer into the summer and is known to have a higher feed value and a greater intake rate by livestock than the other two wheatgrasses.

None of the other grasses seeded in pure stands gave satisfactory yields. Whitmar, a variety of the native bluebunch wheatgrass, produced excellent stands and very satisfactory yields in an earlier study in an adjacent field, but precipitation was higher during that study than in this one.

Sodar wheatgrass and Sandberg bluegrass are well adapted to the soil and climatic conditions in this and similar areas. They establish slowly but good stands are persistent. Both develop good ground covers. They can be planted alone and also with a grass like Whitmar wheatgrass if alternate row seedings are made. When the three were planted together in this study, the basal density of Sodar wheatgrass reached .66 percent and the Sandberg bluegrass .53 percent. Sodar is widely used in the West for roadside stabilization, airport runways and on irrigation canals. Seed of Sandberg is not yet available.

Alfalfa is often recommended for mixed seedings on rangeland. It was clearly not adapted to the limiting conditions in this study.

Climate and Its Effect

Climate, especially precipitation, is widely known to affect establishment and production of forage on semiarid rangeland. Generally, a minimum of 10 inches of annual precipitation is considered necessary for successful reseeding. Good seedings were obtained with much less than 10 inches of precipitation in this study. Success was possible with fall planting in good seedbeds, using proper seeding machinery and well-adapted grasses. When these conditions were met, a grazing capacity of three-fourths to one full animal-unit-month of grazing was realized.

It is claimed that success with rangeland reseeding can be predicted from precipitation for 2 years preceding planting. This was not possible on the soils represented by Portneuf silt loam. In this case, effective amounts of rainfall shortly before or soon after seeding determined whether or not good stands were obtained. This was particularly true in years when precipitation was below the long-time average. Further, rainfall from mid-spring until the grasses were fully headed determined the production in that year.

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