

## REVEGETATION WITHIN THE ST. HELENS ASH FALLOUT ZONE

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An estimated 2.5 to 3 million acres of rangeland received an ash layer ranging from 1/2 to 2 inches deep. The potential exists for increased rates of sedimentation in low areas and of stream loading with sediment from volcanic ash on rangelands with poor vegetation cover. Seeding rangelands with perennial grasses may stabilize the ash and prevent high rates of sedimentation and stream loading. Thus, two studies were initiated in 1981 to evaluate methods for revegetating ash covered lands in eastern Washington. The research is being funded by a grant from the United States Department of Agriculture, Agricultural Research Service, and is being conducted in cooperation with the Soil Conservation Service on private rangeland.

Successful establishment of range seedings usually requires use of adapted species or varieties of plants, preparation of weed-free seedbeds and planting at the proper rate, date and depth. Eastern Washington has low precipitation, especially during the summer months, temperature extremes of -23°F to 112°F, and competition from cheatgrass and Sandberg bluegrass.

Two species of grasses, Nordan crested wheatgrass and Secar bluebunch wheatgrass, have been selected for the study. Crested wheatgrass, an introduced, cool-season, perennial bunchgrass, has been successfully seeded on many acres in the sagebrush zone in the western United States.

Secar bluebunch wheatgrass, a recent release, was developed by the Soil Conservation Service Plant Materials Center, Pullman, Washington. The variety was selected for its superiority in drought tolerance, forage production in precipitation zones of less than 14 inches annually, spring recovery, the ability to establish and provide ground cover, root and crown production, dryland seed yield potential and irrigated seed yield potential. It is a densely tufted bunchgrass with an abundance of narrow leaves, numerous fine stems, small seeds and divergent awns.

Plantings of perennial forage species on cheatgrass ranges have often resulted in failures, mainly because of competition between seedlings and cheatgrass plants during the first growing season. Cheatgrass, a winter annual, is well adapted to ranges in eastern Washington. Seed germination occurs very rapidly after late summer or early fall rains. Young plants remain alive during winter and renew rapid growth early the following spring. If inadequate rainfall occurs in late summer and early fall, the majority of cheatgrass seeds do not germinate until the following spring. Usually these plants head early and mature by early summer.

Successful control of cheatgrass generally requires destruction of two successive seed crops. Seeded stands in southern Idaho were successful when cheatgrass stands were reduced to 12 plants on a square foot during the first growing season. Fall control of cheatgrass and seeding appears effective only in years when there is early and almost complete fall germination of cheatgrass. Some report all or nearly all seeds of cheatgrass germinate the first season when external conditions are favorable. However, others suggest a residue of seeds is left in the soil and litter.

Several methods suggested for seed and plant destruction include tillage, tillage plus herbicide application, and controlled burning followed by tillage or herbicides. Burning can be a desirable initial treatment, destroying seeds and removing the standing crop. Tillage and herbicides can be used to destroy seedlings after germination of the remaining seeds. Removal of standing crop can improve tillage as well as the performance of herbicides.

Results from burning cheatgrass ranges have varied from increasing to decreasing cheatgrass density, and it is apparent that time of burning is very important. Many mechanical methods of seedbed preparation have been used, but discing is the method commonly utilized. The methods utilized, however, usually are determined by cost and availability of equipment. Chemicals that have been effectively utilized in research efforts to kill cheatgrass include paraquat, glyphosate, metabuzin and atrazine.

Conventionally drilling or furrow plantings are considered the best methods of planting except where terrain or obstructions prevent the use of equipment. However, on ash-covered lands, broadcasting alone or broadcasting and packing seeds into the ash layer with heavy rollers such as land imprinters may be quite effective. Broadcast coated seeds also may have an advantage over broadcast uncoated seeds. Use of pelleted seeds on rangelands in the past has been researched and publicized but, generally, results of the practice have been poor and cannot be recommended. One problem encountered with broadcast seeds is lack of soil penetration and coverage except in very loose sandy soils. However, coated seeds broadcast into ash-covered soils may be adequately buried and seedling establishment may be enhanced by coating.

Our research efforts will include two studies to evaluate various methods of seedbed preparations and planting on ash-covered lands. Duration of research projects will be about 3 years.

#### Procedure:

The study site will be 20 miles east of Ritzville, Washington. This is within the area of deeper depths of ash deposition and represents the fine silt-type ash which fell over the largest area. This ash type presents greater problems in terms of contributions to air and water pollution than the fine sand type deposited in the Yakima area.

#### Study 1

The investigation will be designed to evaluate the effect of fall applied methods of seedbed preparation, seed coating, seeding method and season of planting on weed control and seedling establishment of two perennial grass species. Seedbeds will be prepared by (1) discing in early September and again in late October 1981, (2) burning in late September 1981 or (3) burning in late September 1981 followed by spraying with glyphosate (1 pound active ingredient/acre) in late October 1981. Coated (CelPril) and uncoated seeds of Nordan crested wheatgrass (6 pound pure live seed per acre) and Secar bluebunch wheatgrass (6.25 pound pure live seed per acre) will be planted on treated plots by the methods listed in Table 1. The Nordan seed will be purchased from a commercial source; the Secar seed will be provided by the Soil Conservation Service.

Table 1. Seeding methods, species and dates of planting to be utilized in Study 1 near Ritzville, Washington, in 1981 and 1982.

Method	Variety	Treatment	Date	Comments
Rangeland drill	Nordan	Uncoated	Oct. 1981	
Oregon press seeder	Nordan	Uncoated	Oct. 1981	
Brillion seeder	Nordan	Uncoated	Oct. 1981	
	Secar	Uncoated	Oct. 1981	
Broadcast seed	Nordan	Uncoated	Oct. 1981	broadcast after
in conjunction with		Uncoated	Oct. 1981	broadcast before
land imprinter		Coated	Oct. 1981	broadcast after
	Secar	Uncoated	Oct. 1981	broadcast after
		Uncoated	Oct. 1981	broadcast before
		Coated	Oct. 1981	broadcast after
Broadcast with	Nordan	Uncoated	Oct. 1981	
no additional treatment		Uncoated	Feb. 1982	
		Coated	Oct. 1981	
		Coated	Feb. 1982	
	Secar	Uncoated	Oct. 1981	
		Uncoated	Feb. 1982	
		Coated	Oct. 1981	
		Coated	Feb. 1982	

## Study 2

The investigation will be designed to evaluate the effect of fall and spring applied methods of seedbed preparation and seeding method on weed control and seedling establishment of Nordan crested wheatgrass and Secar bluebunch wheatgrass. Seedbeds will be prepared by methods listed in Table 2. Seeds will be planted in fall 1982. Nordan seeds will be planted on the soil surface and in furrows with the rangeland drill. Nordan and Secar seeds, coated and uncoated, will be broadcast planted by the method deemed optimum from the 1981 planting.

Table 2. Seedbed preparation methods and dates of application utilized in Study 2 near Ritzville, Washington, in 1981 and 1982

Method	Proposed date of application	
	First treatment	Second treatment
Untreated	-	-
Discing	Spring 1982	Fall 1982
Burning	Spring 1982	-
Burning	Fall 1982	-
Burning + glyphosate (1 lb. a.i./ac)	Spring 1982	Fall 1982
Burning + paraquat (.5 lb. a.i./ac)	Spring 1982	Fall 1982
Atrazine (1 lb. a.i./ac)	Fall 1981	-
Glyphosate (1 lb. a.i./ac)	Spring 1982	Fall 1982
Paraquat (.5 lb. a.i./ac)	Spring 1982	Fall 1982