The Oregon Press Seeder

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Introduction

A new heavy-duty seeder has been developed for use on the loose, light soils commonly found in the sagebrush-bunchgrass areas of the west. This machine was built by the Oregon State College Agricultural Engineering Department in cooperation with the Squaw Butte Experiment Station, Burns, Oregon. The Station is jointly operated by the Agricultural Research Service, U. S. Department of Agriculture, and the Oregon Agricultural Experiment Station.

Rugged construction of the Oregon Press Seeder permits operation over rocks, brush, and rough terrain encountered in rangelands. Seeding trials using crested wheatgrass, *Agropyron desertorum*, made with this machine have consistently produced better stands of grass on loose soils than the conventional seeding methods—drilling or broadcasting.

Results of range seeding research conducted by D. N. Hyder and F. A. Sneva, Squaw Butte Range Conservationists, dictated the operating characteristics and requirements for the machine. These requirements were: (1) The seed must be placed on firm soil and covered with loose soil; (2) The soil surface should be left rough to help reduce the effects of wind and water erosion; (3) The machine must be capable of operating over rough terrain, rocks, and brush; (4) The machine must be of simple, rugged construction to stand up under the severe operating conditions; and (5) The machine must be inexpensive to operate and must have a first cost that is within reach of the potential users. These requirements have been incorporated in the Oregon Press Seeder.

Development of the Seeder

Two of the hazards in range reseeding are drought and improper seed coverage. These are related in part and emphasize the need for equipment and seeding methods to conserve soil moisture and place the seed at the proper depth. From the work completed at the Squaw Butte Experiment Station, Hyder and Sneva** found that soil moisture retention and seedling survival were greatest when the seed was planted in the bottom of wheel tracks and covered with loose soil. This procedure has been used in other areas and for other crops but is particularly applicable in the light, loose rangeland soils.

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To reduce costs, only a minimum amount of seedbed preparation is carried out before the seeding operation. Some means must be employed to kill the existing brush so that competition for the available soil moisture will be eliminated. One method commonly practiced is plowing with a heavy-duty disk plow. The residue is left on the ground. Seeding equipment must be able to work satisfactorily under extremely trashy seedbed conditions.

Four models of seeder developed

The first model of the Oregon Press Seeder was a 4-row pilot model to test methods of seed placement. A presswheel with a V-shaped rib proved to be a satisfactory solution to the seed placement problem. The presswheel firmed the soil and the rib made a groove in the bottom of the wheel track into which the seed was placed. The seed was covered by means of drag links.

As a result of preliminary tests with Model I, we decided to build an 8-row, field-size machine equipped with ribbed presswheels. Model II was field tested in 1957. Test plots were established in several areas in central and southeastern Oregon. Seedbed conditions ranged from very soft to quite firm.

Seeding trial results

Crested wheatgrass was seeded at the rate of 5 pounds per acre with the Oregon Press Seeder and from 5 to 6 pounds per acre with conventional seeding methods. A comparison was made of the stands produced on areas seeded with the Oregon Press Seeder and on adjacent areas seeded with conventional equipment. The comparison was on the basis of number of grass seedlings per square foot. On the five test plots sampled, areas seeded with the Oregon Press Seeder produced twice as many seedlings on the average as other seeding methods. Greatest success was encountered on very soft seedbeds. Under these conditions, where drilling was an obvious failure, excellent stands were produced. However, on very firm seedbeds, a good drilling operation will produce stands equal to or better than the Oregon Press Seeder.

The current model of the Oregon Press Seeder contains several changes from Model II, pictured above. Heavier presswheels were installed, and a grain box plus four more presswheels were added.

Seeding trials comparing the Seeder with usual seeding methods showed that areas seeded with this machine produced twice as many Crested wheatgrass seedlings per square foot. One such stand shown above.
Model II underwent several modifications after the 1957 seeding season to improve its operation. The wheel support arms were strengthened, heavier presswheels were installed, and a grain box was added. Upon completion of these changes, the machine became known as Model III. This seeder was used by ranchers and government agencies engaged in range improvement programs during the 1958 and 1959 seasons.

Model IV is a 12-row seeder and was built in the summer of 1959. This machine was loaned to the Bureau of Land Management for field seeding operations during the fall of that year. It was used for seeding approximately 1,500 acres in southeastern Oregon and northern Nevada.

Operating Characteristics

Operating characteristics of the several models of the Oregon Seeder have been the same. The presswheels serve a dual purpose--they firm the soil and also act as furrow openers. These wheels are 32 inches in diameter and have a face width of 6 inches. The V-shaped rib on the face of each wheel makes a seed furrow 1-inch deep in the bottom of the wheel track. Each wheel is individually suspended to permit it to follow the contour of the ground and operate over rocks and brush. Wheels are spaced 12 inches apart. Model IV weighs approximately 5,000 pounds. Weight of the frame is transmitted to the presswheels through coil springs. Extra weight may be added to the frame to get the desired depth of wheel track in different seedbed conditions.

Close-wound, tension-type coil springs are used for the lower half of the seed tubes. If the tubes are deflected by rocks or brush, they will snap back into position after the obstruction has been cleared. Rubber sleeves on the end of the seed tubes minimize the problem of wind blowing the seed out of the seed furrow and also help to keep the seed tubes from plugging up when the machine drops down into a hole. Getting adequate seed coverage has posed some problems. Under ordinary, dry seedbed conditions, the standard grain drill drag links are satisfactory. However, under moist seedbed conditions, or in heavy soils, more vigorous covering action is required and heavier drag links must be used.

A standard grain drill box with a fluted-wheel feed and equipped with an agitator is used. The seed metering units are driven by roller chains from the two outside presswheels. Sealed ball bearings have been used in the presswheels and the drive assemblies.

Standard parts used in construction

Standard parts and readily available materials have been used where possible to facilitate construction and maintenance of the Oregon Press Seeder. For example, automotive front suspension springs are used on each presswheel. These coil springs are the same as found on Dodge and similar automobiles from 1949 to date and may be obtained from any auto parts dealer. John Deere plow lift springs make up the lower half of the seed tubes. These springs are held in place with standard plow coulter clamps. The sealed ball bearings are of the sizes commonly stocked by bearing suppliers. No. 40 roller chain has been used throughout the seeder drive assembly. Only the chain tighten spindle requires special machining operations. Welded construction has been used extensively. With the exception of the presswheels, construction of the Oregon Press Seeder is possible for ranchers who have well-equipped farm shops.

Although the Oregon Press Seeder weighs approximately 5,000 pounds, the power requirement to pull the machine is not excessive. A two-plow tractor operating in third gear provided sufficient power for the test plot seedings (approximately 25 drawbar horsepower). On one field seeding operation, a Dodge Power Wagon was used as the prime mover. The power requirement, of course, will vary depending upon the condition of the seedbed and the steepness of the terrain.
Ease of transportation considered

Ease of transportation between seeding operations was kept in mind when the physical size of the Oregon Press Seeder was established. With the tongue folded back in the transport position, the seeder measures less than 8 feet from front to back and can be transported on a flatbed truck without a wide load permit. The seeder measures 13 feet 9 inches from end to end.

Availability

At the present time, both Models III and IV are operative and are located at the Squaw Butte Experiment Station. Inquiries concerning the use of these machines should be directed to W. A. Sawyer, Superintendent, Squaw Butte Experiment Station, P. O. Box 833, Burns, Oregon.

Plans and drawings, including a bill of materials, are available. These may be obtained for $3.60 per set from M. G. Huber, Extension Agricultural Engineer, Oregon State College, Corvallis, Oregon.

Further modification of the Oregon Press Seeder will be the result of commercial production practices and as dictated by more extensive field testing. The seeder has now been turned over to the Interagency Range Seeding Equipment Committee with the U. S. Forest Service Arcadia Equipment Development Center being given the responsibility of further testing and development. The name of the machine, previously referred to as the Oregon Rangeland Seeder and Desert Flower, was changed to Oregon Press Seeder to avoid confusion with the U. S. Forest Service Rangeland Drill.

It is anticipated that at least eight Oregon Press Seeders will be built under contract for federal agencies in 1961. Contracts for these machines will be handled by the Arcadia Equipment Development Center, 701 N. Santa Anita Drive, Arcadia, California. Those interested in purchasing an Oregon Press Seeder may obtain the name of the manufacturer from the Arcadia Equipment Development Center and contact the manufacturer directly. Cost of the seeder is expected to be less than $5,000 depending upon the number of machines built.

The Oregon Press Seeder is not intended to be a universal seeder. It has limitations as does any other piece of equipment. Based on test results to date, this machine performs best on loose fluffy seedbeds. Its rugged construction features make it capable of operating over rough terrain and can take rocks and brush in stride with a minimum of maintenance and operating difficulties.

Development of the Oregon Press Seeder was cooperative between research workers at the Squaw Butte Branch Experiment Station and agricultural engineers with the Oregon Agricultural Experiment Station. The Squaw Butte station is jointly administered by the Agricultural Research Service, U. S. Department of Agriculture and the Oregon Agricultural Experiment Station of Oregon State College.