

Manual Gravel Spreader for Covering Seeds in Containers

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A manual gravel spreader that applies gravel to seedling containers precisely and efficiently has been developed. The gravel spreader can be modified so that available materials, different kinds and sizes of seed-covering materials, and various types of containers can be used.

Seeds sown in containers must be covered to prevent them from washing away and to inhibit the buildup of moss and algae on top of the containers. Several devices have been developed to spread covering material, generally granite grit or basalt gravel, over the seed. A simple manual gravel spreader designed recently at the Pacific Southwest Forest and Range Experiment Station applies gravel almost as efficiently as the automated revolving-drum type (1), and more precisely than the manual shutter-box type. This gravel spreader can be adapted for use with different types of containers and with various kinds and sizes of seed-covering material.

The gravel spreader consists of a top storage bin positioned over three steel plates, all held by a frame. The storage bin is 3½ inches deep and is covered by ¾-inch expanded steel mesh

(fig. 1). The mesh, attached to the storage bin by hinges, keeps the operator's fingers away from the holes in the top and middle plates. The top and middle plates are ⅜-inch steel; the bottom plate is ¼-inch steel. The holes in all three plates are ¾ inch in diameter and have the same arrangement as the containers in the rack. The top and bottom plates are held in a fixed position so that their holes do not line up (fig. 2). The middle plate slides between the top and bottom plates and is operated by a lever-type handle.

To operate the gravel spreader, 2 millimeter-size gravel is placed on the top plate. A rack

of containers is placed underneath (fig. 2A). The middle plate is moved so that the holes in it align with the holes in the top plate. When the holes in the two plates are aligned, gravel falls into each hole of the middle plate (fig. 2B). Because of ridges between each row of holes on the top plate, gravel continuously fills the holes of the middle plate. Movement of the middle plate agitates the gravel in the top holes and insures that the holes in the middle plate are filled when lined up with the top holes. When the holes of the middle plate are aligned with the holes in the bottom plate, gravel falls

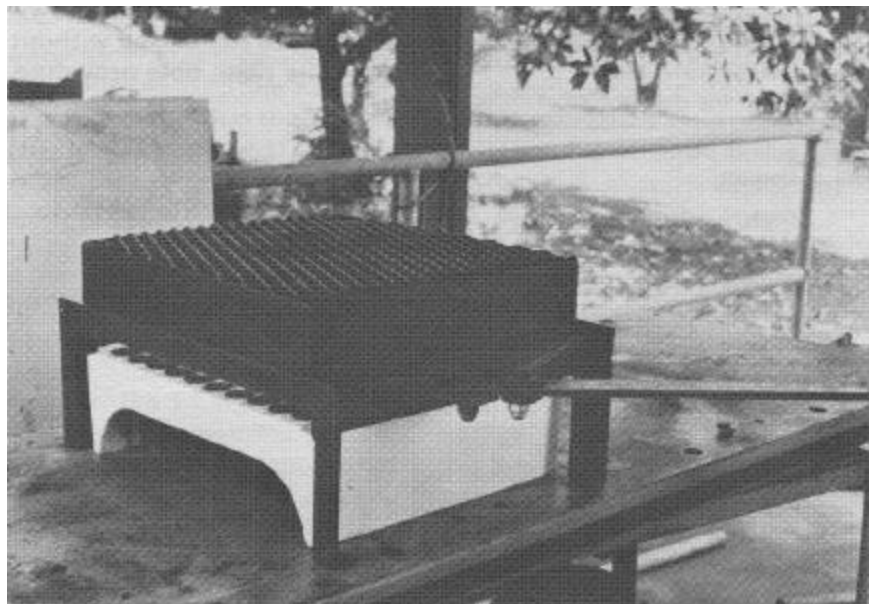


Figure 1.—This manual gravel spreader applies gravel ¼, inch deep in each of 100 dibble tubes. It adapts readily for use with other containers.

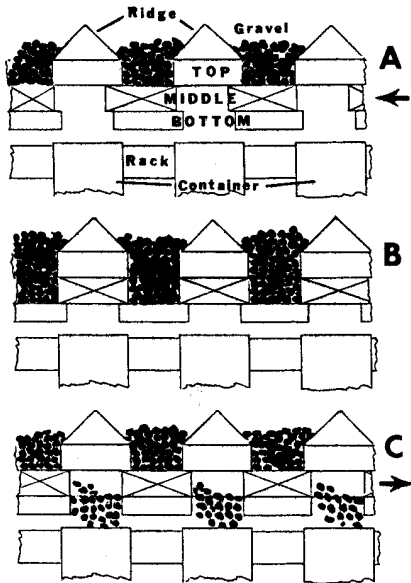


Figure 2.—Schematic of the operation of the manual gravel spreader: (A) Holes in the top plate are filled with gravel. (B) The middle plate is moved so that holes in it align with holes in the top plate; gravel drops into the holes. (C) As the middle plate is moved so that the holes in it align with those of the bottom plate, gravel falls into the containers.

through to the containers (fig. 2C). A gravel-spreading cycle, which includes placing a rack of containers under the gravel spreader, applying the gravel, and removing the rack, requires about 20 seconds.

The amount of gravel applied depends on the thickness of the middle plate and the diameter of the holes in the middle plate. This gravel spreader is designed to apply about $\frac{1}{4}$ inch of gravel into each container. If more gravel is needed, a thicker middle plate can be used; if less is needed, a thinner middle plate can be used.

The hole diameters are fixed by the spacing of the containers. Our containers are spaced on $1\frac{3}{4}$ -inch centers. This allows $\frac{1}{2}$ -inch holes to be used without the middle plate hole providing

direct gravel flow from the top plate through the bottom plate. For containers spaced closer than $1\frac{3}{4}$ -inch centers, smaller holes can be used or gravel spreading can be done in two steps, every other row at one time.

Because it applies the desired amount directly into the containers, this gravel spreader conserves gravel. There is no excess gravel to be brushed from the top of the racks or swept from the floor.

Literature Cited

1. Nyborg, E. D.; G. Shikaze. *Development of high capacity precision seeding, loading, and handling equipment for container nurseries. Proceedings of the North American Containerized Forest Seedling Symposium; 1974 August 6-29; Denver, CO. 1974: 146-157.*