A SMALL-LOT SEED SCARIFIER POWERED BY AN ELECTRIC DRILL

THE hard seed character found in many varieties of Lupinus spp. requires seed to be scarified for satisfactory germination. Rubbing small lots of seed between layers of sand paper has proved unsatisfactory. Similarly, the tedious process of cutting each seed with a dissecting needle or scalpel was effective but too time consuming when working with large numbers of selections. Therefore, an efficient, simple, and inexpensive electric-drill-powered scarifier was designed and is herein described.

Materials needed to construct and power the scarifier include a 14-inch electric drill, 1/2-inch plywood stock, an empty 12-ounce juice can, about 8 pieces of 1/8-inch welding rod 4 inches in length, a 1/4-inch by 8-inch machine bolt, and a few sheets of coarse garnet paper or emery cloth. Dimensions cited are applicable when the juice can is 4 3/4 inches deep and has an inside diameter of 2 3/8 inches.

Two circles (Disks A and A') 2 9/16 inches in diameter and one circle (Disk B) 3 1/2 inches in diameter are scribed onto the plywood stock. A 1/4-inch hole is drilled through the center of each disk. In Disk A drill 8 equally spaced 1/16-inch holes within the circumference and alternately 1/8 inch and 3/32 inch from it. Care must be exercised to ensure that the holes are not so close to the circumference that they will later break through the edge of the disk. Drilling all holes before cutting out parts insured having their axes perpendicular to the surfaces of the disks. The machine bolt, which serves as the central shaft of the rod assembly, is run through a die to extend the threaded portion to at least 2 inches. The bolt head is cut off and the rough edges of the shank smoothed and rounded.

The finished scarifier is made up of two units, the rod assembly and the drum assembly. The rod assembly is completed as follows. A 3/8-inch nut is threaded onto the central shaft, followed in turn by a 1/16-inch washer, Disk A, Disk B, another 1/8-inch washer, and finally two more tightly applied 1/8-inch nuts. The short lengths of welding rod are then driven into the 1/8-inch holes in Disk A. Details of assembly are shown in figure 1.

The drum assembly is constructed as follows. One end of the juice can is cut out, a 1/4-inch hole is drilled through the center of the opposite end, and two 1/8-inch holes are marked and drilled on Disk A'. The disk is then dropped into the cylinder, positioned, and secured to the bottom of the can with 1/8-inch stove bolts. The drum assembly is completed by cementing a 4 by 7 3/8-inch piece of garnet paper or emery cloth to the inside of the cylinder. In order to prevent rapid wear of Disk A, the abrasive paper or cloth should not extend closer than 1/2 inch to the open end of the cylinder.

Before using the scarifier, the wooden bearing surfaces should be lubricated by rubbing them with paraffin. This treatment will eliminate the "chatter" which may result from the moving metal-to-wood contact.

The scarifier is used in the following manner. The threaded end of the central shaft of the rod assembly is tightened in the chuck of the drill. Seeds to be scarified are poured into the drum, and the rod assembly inserted until the open edge of the drum is firmly against Disk B (figure 2). The long axis of the drill-scarifier is pointed at a slight downward angle to prevent catching seeds in the bearing surfaces of the drum and disks, and the power is applied. Time of treatment varies with the kind and quantity of seed being treated. A 10-second treatment has sufficed for small seed lots (200 seeds) of yellow lupine (Lupinus luteus L.) and Crotalaria spectabilis Roth. Seed

NOTES

Literature Cited


Figure 1—Components and assembly details of the seed scarifier. A = Disk A; A' = Disk A' secured to the bottom of the drum assembly; B = Disk B; N = 1/8-inch nuts and washers; D = drum assembly; WR = 1/8 by 4-inch welding rod; CS = 1/4 by 8-inch machine bolt serving as central shaft.

Figure 2—The seed scarifier completely assembled. The wooden bearing surfaces should be lubricated by rubbing them with paraffin. The treatment will eliminate the "chatter" which may result from the moving metal-to-wood contact.