How to Calibrate Hand-carried Truck-mounted Granular Spreaders

By
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CALIBRATING hand-carried or truck-mounted spreaders for granulated pesticides is similar, in principle, to the calibration of spray rigs. In both cases you measure the amount of pesticide, either weed killer or insecticide, discharged over a given area.

Manufacturers of most equipment have already calibrated their equipment and provide directions for setting their spreaders. However, often it is necessary to use equipment which is no longer new, or the manufacturer's directions have been lost, or we are using a pesticide not similar to materials for which the spreader was originally calibrated. In these cases, equipment must be adjusted to assure proper application.

Check Basic Requirements

Broadcast spreaders range from the shoulder-carried cyclone type with only one adjustable control, to truck-mounted power units with rotating disks and numerous adjustable controls. Regardless of the size or complexity of the spreader, the following approach should be used to check the usefulness of the particular spreader. First, determine the rate at which the granular pesticide is to be applied for your needs. Rates are stated on product labels along with notes stating necessary precautions for handling and applying.

Next, you must consider four characteristics of your spreader.

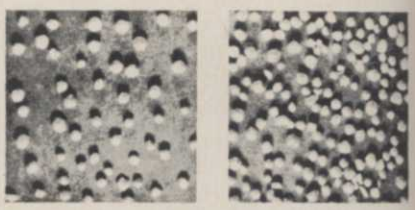
1. Will the spreader handle the pesticide satisfactorily; do the granules readily flow out of the hopper and through the spreader?
2. Does the discharge from the spreader fall uniformly over the ground, thus treating the area evenly.
3. Is the rate of application you desire within the limits of the spreader? Spreading capacities might be estimated at any of three rates: 50 lbs./A., 500 lbs./A., or 5000 lbs./A.
4. Is the spreader capable of applying granules in rows at widths you desire?

If the answer to any of the first three questions is "No," then consult the manufacturer's manual about adjustments, or get a spreader with greater bulk or better distribution capacities. Usually, the discharge of a large spreader can be cut down to a very small rate if granules are small enough to continue to flow out of the hopper.

Use Sack to Calibrate Hand-carried Spreaders

For calibrating hand-operated spreaders, you will need the following equipment: a measuring tape, a large cloth bag, and a set of household scales. A marking pen or crayon may also be needed if the discharge setting device is not already marked on the spreader.

The first important step is to establish a constant rate of travel for the spreader. During the first calibration trials, the walking speed should be fixed at a medium rate. Later, you may wish to increase or decrease travel speed as a method to attain the exact application rate desired.



Compare the different rates at which granule spreaders apply pesticides from preset calibration trials. On the left, 25 granules were scattered at ½ lb./100 sq. ft. or 200 lbs./A. The 151 granules on the right were applied at 3 lbs./100 sq. ft. or 1,200 lbs./A. By using a maladjusted spreader that applies even ¼ lb./100 sq. ft. too much, 25 extra granules per sq. inch are spread at extra cost and where they are not needed.

Next, prepare to operate the spreader with pesticide in it. In order to avoid wasting the pesticide or actually treating the test area at an improper rate, tie the large cloth bag around the spreader to catch all the pesticide discharged.

Now select the appropriate quantity of chemical for a trial. This should be about 1% or 2% of the recommended quantity for one acre. If directions are stated in terms of lbs./100 sq. ft., then use enough to cover about 500 sq. ft. Make a note of the weight of the granules, put them in the spreader, and walk at a medium speed while operating

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How to Adjust Granular Spreaders With V-shaped Hoppers

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DRY GRANULAR herbicides, fungicides, insecticides, and fertilizers are usually applied with spreaders that meter the formulation through adjustable discharge ports in the bottom of the spreader. Although many of these spreaders give approximate settings, it is practically impossible for a manufacturer to provide accurate rate settings for products other than their own granular materials.

Applied Rates Depend on Granules

The metered application rate at any given setting will vary for different materials. Density, particle size, and flowability are common material characteristics which vary and affect the application rate. Finely powdered material that tends to pack often can be applied only with those spreading devices equipped with special agitators to maintain a steady flow. If there is a considerable variation from bag to bag in particle size and product density, or if the forward speed of the spreader changes appreciably during application, rates are apt to be affected.

Generally, it is necessary to establish a spreader setting that will apply a desired amount of granular material per square foot of soil surface, usually figured per 100 sq. ft. or per one acre. This is called "establishing the rate."

Parts of spreaders, particularly the metering mechanism, will wear. Worn mechanisms require adjustments to maintain the rate of application according to standards or tolerances set forth by the original manufacturer. This adjustment is normally referred to as "calibration" and usually can be done only by instructions from the manufacturer.

Rate Establishment Based on 100 sq. ft.

To establish the rate by which granules will spread from an applicator, equipment measurements and a treatment area (100 sq. ft.) must be determined for use as standards. First, measure the width (W) of the spreader in *feet*. Divide 100 by the width (100/W); this will give the lineal feet (F) the spreader must travel to cover 100 sq. ft., 100/W = F. Select an area of turf to be treated and mark off the lineal feet (F). As a double-check, the length of this area (F) multiplied by the width of the spreader (W) should then equal 100 sq. ft., or F x W = 100 sq. ft.

Application Rate Adjusted by Three Methods

Now that a standard treatment area has been marked, the rate of discharge for V-shaped hopper spreaders may be established by any of three methods.

Method 1: Fill the spreader half full with granules. Weigh both the spreader and the granules and record their total weight. Adjust the spreader's output rate to an approximate setting and operate it over the lineal feet (F) marked for the test plot. Again, weigh the spreader and its contents. Subtract the second weighing from the first; the answer will be the number of pounds of granules you applied on 100 sq. ft. If the weight of material applied is more or less than the desired or recommended rate, readjust the spreader's output and make another test run until the correct setting is established.

Method 2: Construct a lightweight metal pan 2 inches deep, 6 inches wide, and of sufficient length to fit between the wheels of the spreader. Drill a hole in each corner of the pan and fasten a piece of wire in each hole. This pan then can be hung beneath the spreader and should catch *all* of the granules. Next, determine the desired rate of product application (from label or other recommendations) per 100 sq. ft. Fill the spreader half full of material and operate it over the lineal distance (F). Weigh the granules caught in the pan (do not include the pan's weight). If the amount of material is more or less than the recommended rate per 100 sq. ft., reset the spreader and make another test run until the correct setting is established.

Method 3: Agitators of most hand-pushed spreaders are driven by one wheel only. Find the wheel that drives the agitator and drill a ¼-inch hole near its outside edge. Fasten a ¼-inch

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the spreader. Mark your starting point and where the granules are depleted at the end of the test run. Measure the distance between these two points, and multiply it by the width of the spreader's swath. The answer will be the area of the treated plot in square feet.

Length of test run (ft.) × Width of swath (ft.) = Sq. ft. treated (A)

Now the actual application rate can be computed by using the following formula.

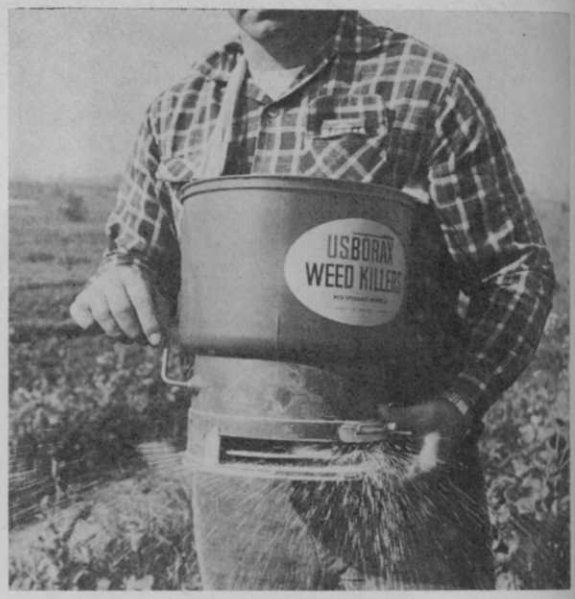
$$\frac{\text{Weight of pesticide (W)}}{\text{Area covered in trial (A)}} = \text{(P) pesticide lbs./sq. ft.}$$

To compare the actual rate with the recommended rate in terms of lbs./100 sq. ft., multiply the answer (P) by 100. To express the actual rate in terms of lbs./A., multiply (P) by 43,560. If the actual rate of the trial is not correct, pour the pesticide from the cloth bag back into the spreader, and repeat the trials until the recommended rate is obtained. When the actual rate from a trial is low, increase the discharge from the spreader or decrease the travel speed. When the actual rate is high, decrease the discharge or increase the speed.

Calibrate Truck-mounted Spreaders with a Tarp

Because of the larger equipment, calibration of truck- or tractor-mounted power spreaders is slightly different than adjusting hand-carried spreaders. A light tarpaulin will be needed to catch the discharged granules as was the cloth bag for the smaller spreader. Fasten the tarp to the bottom of the spreader or to the back of the truck body. Then drape the tarp around the sides of the spreader forming a hammock that will catch the flying granules which should be retained during trial runs.

Since the width of swath is greater with such power equipment, a larger test area and hence more pesticide in each trial will be necessary. Use 5% to 10% of the quantity recommended per acre or enough to cover about 3,000 to 5,000 square feet. Again, note the weight of granules used, measure the distance of the trial run, compute the area covered, and convert to lbs./100 sq. ft. or lbs./A. as previously described. Compare the actual output rate with the recommended rate and either increase or decrease the discharge rate, or change travel speed so that actual discharge matches the desired rate.



Hand-carried granule spreaders are calibrated by moving only a few adjustment knobs, one under this operator's thumb. Walking speed or the spreader's output can be changed to assure the proper application rate.

Seed Drills Calibrated

If a drill-type seeder is used to distribute pesticide on or beside a row of plants, essentially the same procedure should be used. Note whether the "Directions For Use" on the pesticide container express application rate as lbs./A., lbs./100 lineal feet, or lbs./1,000 lineal feet of row. In any case, granules can be caught in cans secured over the ends of each tube.

Weigh the *pesticide* caught in the can, but not the can. Divide the weight by the length of the row along which the test run was made. The answer is lbs./lineal foot. Multiply this by 100 to get the rate in lbs./100 ft., or 1,000 to get 1,000 lineal ft.

If only one drill tube is used during the trial runs, multiply the actual rate obtained, per lineal feet, by the number of drill tubes on the seeder to get the total discharger rate for the entire seeder unit (T). Multiply the recommended rate, per lineal feet, by the number of drill tubes to get the total rate for the entire seeder unit (R). Compare the actual discharge (T) with the total recommended for that seeder (R). If they are not equal, repeat with trial runs until the output equals the recommended dose. This can be done by increasing or decreasing the discharge of all the drill tubes or by changing the travel speed.

As more chemicals are developed and as regulations governing their use become more stringent, it becomes increasingly important to accurately follow label directions for use. Making certain that application equipment is properly calibrated will not only save you money on the cost of pesticides, but it will help assure the proper results and conformity with regulations where they exist.

Purdue Offers Tree Guide

Yard tree planting tips illustrated with diagrams to show correct planting mixtures and bracing, trimming, and placement techniques, are offered in "Planting Yard Trees," an information piece now available from Purdue University.

For a copy of the tree planting guide, ask for publication HO-43, Agricultural Publications, AES Building, Purdue University, West Lafayette, Ind. 47907.

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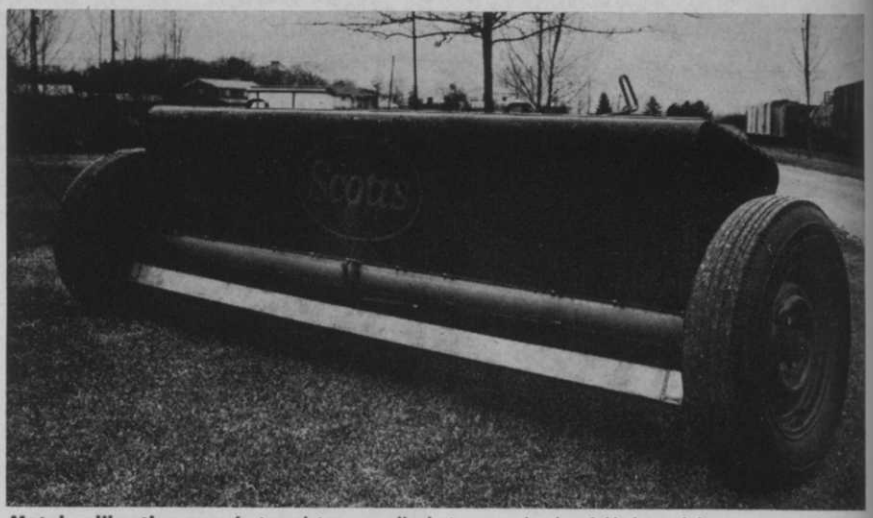
bolt 3 inches long into the wheel so it can be used later to turn the wheel. Measure the circumference (distance around) of the wheel in *feet*. Divide this figure into the lineal feet (F) the spreader must travel to cover 100 sq. ft. Lineal feet, in this case, are determined by dividing 100 by the diameter of the spreader's output pattern (D), or 100/D = F. By dividing the circumference of the drive wheel by the linear feet, you determine the number of wheel revolutions required for the spreader to cover 100 sq. ft. Now fill the spreader half full with granules and estimate its rate setting. Place the spreader over a large sheet of paper or cloth; block up the drive wheel side of the spreader so that it is about ½ inch off the ground. Next, open the spreader, and by using the bolt as a crank, rotate the wheel the same number of turns required to cover 100 sq. ft. Crank the wheel at the approximate speed at which it would move under normal applications. Weigh the material on the paper. If the amount collected is more or less than the recommended rate, per 100 sq. ft., reset the spreader and repeat the test until the desired rate is applied.



Metal calibration pan fastened temporarily between wheels of V-shaped hopper spreader and hung directly below slot in bottom of hopper to catch granule output. Granules are retained in this catch pan and weighed after each trial run.

Some spreaders are specifically designed and manufactured to apply granulated materials quite accurately. Other spreaders are designed primarily for fertilizer applications where accuracy is not as important. Generally speaking, those multi-purpose spreaders which are made to apply herbicides, pesticides, and also fertilizers are of necessity manufactured at closer tolerances and for greater accuracy than are typical fertilizer spreaders.

Banvel D, 2,4-D Use With Fertilizer Is Described

Banvel D herbicide and 2,4-D have both been approved for use in combination with dry fertilizer to control broadleaf weeds in established lawns (not pastures) and golf courses, according to Velsicol Chemical Corp.

A formulation was approved for use in spring or fall at the rate of 5 lbs. per 1000 sq. ft. (½ lb. of Banvel D and 1-1½ lbs. 2,4-D per acre.)

One application per year, if needed, for control of dandelion, plantain, chickweed, knotweed, clover, sheep sorrel, stitchwort, buckhorn, dog fennel, mustard, and other broadleaf weeds is recommended by the company.

Applications to moist grass are said to give best results. Turf should not be mowed or watered for 24 hours after treatment.

For additional information write Velsicol Chemical Corp., 341 East Ohio St., Chicago, Ill.