ENH62

UF UNIVERSITY of FLORIDA
IFAS Extension

How to Calibrate Your Fertilizer Spreader[1]

L. B. McCarty and Jerry B. Sartain[2]

Fertilizer application is only effective if you ensure uniform coverage (Plate 22). Dry fertilizers can be applied with either a drop (gravity) spreader (Figure 1) or a rotary (centrifugal) spreader (Figure 2).

Plate 22.

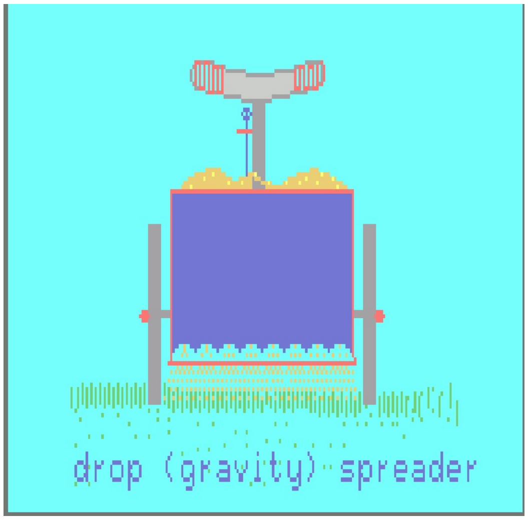

Figure 1.

A drop spreader has the advantage of applying a fairly exact pattern since this is limited to the distance between the wheels (Plate 16). This also allows a "tight" pattern (line) to be cut but requires that each pass meets exactly with the previous one or skips will be noticeable. Wide (> 6 feet) drop spreaders can become cumbersome in the landscape by limiting access around trees and shrubs and getting through gates. The agitator in the bottom of the drop spreader's hopper also may break the coating of some slow-release fertilizers.

The cyclone (also known as rotary or centrifugal) spreader (Plate 23) generally has a wider pattern of distribution compared to a drop spreader and thus can cover a larger area in a short time. The application pattern of the cyclone spreader also gradually diminishes away from the machine, reducing the probability of an application skip. The uneven, wide pattern of the cyclone spreader is

1. This document is ENH62, one of a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date May 1991. Reviewed April 2009. Visit the EDIS Web site at http://edis.ifas.ufl.edu.
2. L. B. McCarty, associate professor, Commercial Turf Specialist, Environmental Horticulture Department; Jerry B. Sartain, professor, Soil Scientist, Soil Science Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.
The term "plates," where used in this document, refers to color photographs that can be displayed on screen from CD-ROM. These photographs are not included in the printed document.

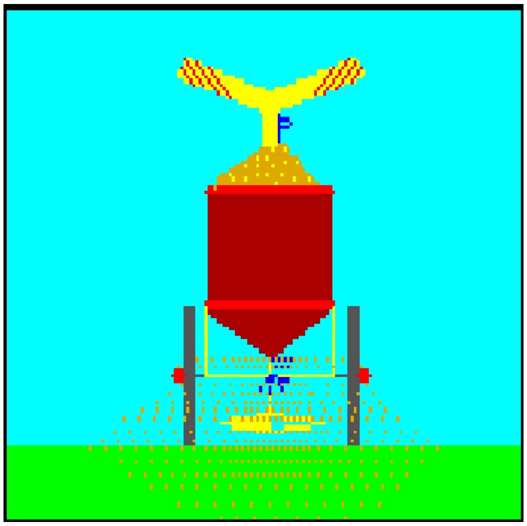

Figure 2.

Plate 16.

initially harder to calibrate and heavier fertilizer particles tend to sling farther away from the machine. However, proper calibration and experience minimize these.

Plate 23.

A recent improvement in fertilizer spreader technology is the use of air to apply the material to the turf. This produces a fairly wide pattern (like the cyclone spreader) that is somewhat exact (like the drop spreader) without damaging the granules or slinging heavier particles farther. Wind and rain effects also are reduced using the technology but initial equipment expense and application expertise are higher.

Spreader calibration involves measurement of the fertilizer output as the spreader is operated over a known area. One way to ensure uniform application of material is to divide the material into two equal portions. Use a spreader calibration which will deliver one-half the correct amount of material. Make an application over the entire area, turn the spreader direction ninety degrees (90°) from the initial application, and make a second application. This eliminates skips in the coverage. Accordingly, calibration of the spreader should be based on one-half desired application rates. A flat surface, a method of collecting the material, and a scale for weighing the material is needed for calibration. The following sequence of steps will aid in calibrating a fertilizer spreader.

CALIBRATING A DROP-TYPE (GRAVITY) SPREADER

Follow these steps, in order, to calibrate your drop-type (gravity) spreader (Figure 1).

1. Check the spreader to make certain all the parts are functioning properly.

2. Mark off an area which when multiplied by the width of the spreader will give 100 square feet of area. For example, the length required for a 1 1/2-, 2-, and 3-foot spreader is 66 2/3, 50, and 33 1/3 feet respectively.

3. Fill the spreader with the material you wish to apply (fertilizer, seed, herbicide, lime, other). Fill the hopper only to the level you will have when the material will actually be applied.

4. Make several trial runs over the area and practice opening the spreader as you cross the starting line and closing it at the finish line. Opening the spreader before it is in motion will result in nonuniform distribution. Walk at a pace which will be used when actually applying the material.

Open and close the spreader gradually, not in a fast, jerky motion.

5. The weight of the material applied by the spreader must be determined. It can be swept up from a hard surface or caught on a large piece of paper or plastic. The easiest method is to attach a catch pan (cardboard works nicely) under the spreader openings and catch the material in the catch pan during the test run to determine how much was applied.

6. Begin calibration at the lowest setting and proceed at progressively higher settings (larger openings). The more trials at a given setting, the better will be the average rate of application. Usually three trials at a given setting are enough to obtain a reliable application rate. Weigh the material and record the information on each trial run for future use.

7. One of the calibrated settings will approximate the correct rate of material. *Example*: You want to calibrate a spreader to apply 1 pound of nitrogen per 1000 square feet using a 10-10-10 fertilizer. This calculates to 10 pounds of fertilizer per 1000 square feet since the material is 10% nitrogen (10% x 10 pounds = 1 pound nitrogen). Since the area for calibration trials in only 100 square feet, apply one-tenth of 10 pounds or one pound of fertilizer per 100 square feet. The spreader setting should be 11 for this example if you obtain the following results shown in Table 1 from your calibration trials with your spreader. If the desired application rate was 0.5 pound of nitrogen (5 pounds of material per 1000 square feet or 0.5 pound per 100 square feet) a setting of 7 should be used. Careful calibration is suggested for the complete spreader range. Settings are not necessarily linear, therefore, half of a particular application rate may not necessarily be obtained by using a setting number half the original.

8. The same calibration procedure is used for any material you want to apply. Since the quantity applied depends upon the physical properties of the material, the same settings cannot be used for different materials, even if the ratios are the same. Once the spreader is calibrated and set for the proper rate, any size area can be treated accurately.

CALIBRATING A ROTARY (CENTRIFUGAL) SPREADER

1. It is important that the "effective" width of application be determined first. Follow these steps, in order, to calibrate your rotary (centrifugal) spreader.

2. Check the spreader to make certain all parts are operating properly.

3. Fill the hopper about half full with the material you plan to apply and run it with the spreader setting about half open (medium setting). Make the application on bare ground or hard surface where the width of surface covered by the material can be measured.

4. Rotary spreaders (Figure 2) do not apply a constant amount of material across the entire width of application. More material is applied toward the center and less at the edges. For this reason, the width of application is accurate for a constant application rate only at about 2/3 (60 to 70%) of the actual width measured. *Example*: If the application width is 12 feet, only about 8 feet or 4 feet across both sides of the spreader, within the band of application, is receiving approximately the same application rate. The other 2 feet on each edge respectively receive much less material than the center area. Once this "effective" width is determined, calibration is fairly simple.

5. Mark off a test distance which when multiplied by the effective width will give you a 1000 square foot area. For this example, assume that the "effective" width is 10 feet. Then the test strip will be 100 feet long since width times length is 10 x 100 or 1000 square feet. *Note*:

This calculation is based on "effective" width of application and not the total width.

6. Determine the amount of material to be applied. *Example*: To apply 1 pound of nitrogen per 1000 square feet using a 1648 fertilizer, 6.25 pounds of material should be applied per 1000 square feet.

7. Fill the hopper with a known weight of fertilizer and adjust the spreader to the lowest setting which will allow the material to flow. Push the spreader down the center of the test area, opening the hopper at the starting line and closing it at the finish. Weigh the material left in the spreader and subtract that amount from the starting weight to determine the amount used per 1000 square feet. The beginning weight minus the ending weight tells how much material was applied per 1000 square feet.

8. Repeat the preceeding step at successively greater settings (openings) and record the material applied at each setting.

9. Select the spreader setting which most closely applies the desired rate of material, set the spreader accordingly, and use it on any size area. To obtain uniform spread of material, remember to set the spreader at half the desired rate of application and make two passes at 90° to each other. Strive for proper spread overlap during application. *Example*: If the "effective" width is 10 feet, after each pass, move the spreader over 10 feet from the center of the tire tracks. This will give a fairly constant rate of application over the entire area.

Table 1.

Table 1. Example of calibration trial results from No. 7.

Setting	Output
1	2 ounces
3	3 ounces
5	6 ounces
7	8 ounces
9	10 ounces
11	16 ounces