

Calibration of Manure Spreader Including Swath Width

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Manure spreaders similar to dry fertilizer spreader trucks, can be calibrated correctly when a swath width is determined along with spread pattern evaluation and application rate on "as spread" basis. This procedure helps ensure good nutrient management and utilization of waste as well as protect the environment if buffer zones and vegetative covers are properly used. Manure storage in stack houses for timely application to the land also improves environmental aspects.

Calibrating a manure spreader is a simple, easy management tool that can help the farmer use nutrients from animal waste more efficiently. The procedure takes less than an hour but can save hundreds of dollars. By knowing the application rate of the manure spreader, correct amounts of manure can be applied to meet the crop needs. Over-application of manure wastes nutrients and increases the chance of ground water contamination.

Using manure wisely is important for the farmers' crops and for their pocketbooks.

There are two parts to "calibrating" a manure spreader: determining the application rate and determining the spreader swath width. The following procedures work best for solid or semi-solid animal waste including broiler litter, horse and cow manure.

Materials Needed

- * Large plastic bucket (five gallon bucket)
- * Plastic tarps (5-10' x 10')
- * Tent stakes or large nails (20)
- * Scale
- * 100' tape measure
- * Broom
- * Small flag or colored rag
- * /Soil, Crop, Fertilizer and Chemical Recordbook/ (UGA Publication Agronomy 2-2)
- * Calculator

Determining the Spreader Swath Width

- 1) Weigh individual tarps and bucket.
- 2) Lay the tarps out in a line perpendicular to the travel of the spreader. Fasten the tarp at each corner, eyelet on eyelet, with a tent stake or long nail through eyelets.
- 3) Push a flag into the ground or secure a colored rag at the center on the edge of the middle tarp. This helps the driver center the spreader as he drives over the tarps.
- 4) Drive the spreader over the tarps at the speed normally driven when applying manure on the field. Make sure speed and application rate are under steady state conditions.
- 5) Depending on how sticky the manure is, there are two options:
 - a) If the manure is dry, carefully pull up the tarps and pour the manure into the bucket or
 - b) If the manure is sticky, carefully pull up the tarps. Fold the tarps up and stuff them into the plastic bucket.
- 6) If the manure is dry, carefully pull up the tarps and pour the manure into the bucket or
If the manure is sticky, carefully pull up the tarps. Fold the tarps up and stuff them into the plastic bucket.
- 7) To plot the swath width on a graph, the "y" axis equals the amount of manure per square foot and the "x" axis is the distance from the center of the truck to the center of each tarp. The "y" axis also represents the center of the middle tarp. At the points on both sides on the "x" axis that are 1/2 the "y" axis is the effective swath width. By over-lapping swaths each trip up or down the field, even distribution of the manure can be achieved. (See Figure 1.) (Pounds of manure deposited on tarp) divided by (Square feet of the tarp) = Amount of manure per square foot. The advantage of plotting the swath width over visual inspection is being able to identify uneven patterns of manure distribution. This, of course, makes it easier for the operator to correct the spread pattern of his truck and helps prevent over-application of manure.

Determining the Manure Application Rate

1. Determine manure spreader capacity.

Spreader Size (Bushels)	*Tons of Manure*
70-75	1.5
90-100	2.0
125-135	2.5
180	3.0

- 1) After determining the swath width, lay tarps and flag or rag back as outlined in Steps 2 and 3 previously mentioned.
- 2) Drive the spreader centered over the tarps, plus over each side using the proper swath width, at the speed normally driven when applying manure on the field. Make sure speed and application rate are under steady state conditions.
- 3) Carefully pull up a tarp and weigh it. If Step 3 is followed carefully, the weight per square foot of each tarp should be the same.

- 4) Check Chart 1 on Manure Application Rate for pounds applied and size of tarp, then read tons of manure applied per acre if you have tarps sized for the chart.
- 5) If the size of your tarp is not listed, use the following equation to determine the amount of manure applied per acre: (Pounds of manure on the sheet *21.79) divided by (Area of the sheet in square feet) = Tons per acre.
- 6) Record the tons per acre applied in the /Soil, Crop, Fertilizer and Chemical Recordbook/ available at your County Extension office. Soon, possibly by the next Farm Bill, documentation of manure application rates will be required.
- 7) Sweep the tarps to get off any sticky or dry manure before folding.

Chart 1. Manure Application Rate

Pounds of Manure Applied to Sheet* *Size of Plastic Sheet

8' x 8'* *10' x 10'* *10' x 12'

Tons Manure Applied/Acre

1	0.34	0.22	0.18
2	0.68	0.44	0.36
3	1.02	0.65	0.54
4	1.36	0.87	0.73
5	1.70	1.09	0.91
6	2.04	1.31	1.09
7	2.38	1.52	1.27
8	2.72	1.74	1.45
9	3.06	1.96	1.63
10	3.40	2.18	1.82
11	3.74	2.40	2.00
12	4.08	2.61	2.18
13	4.42	2.83	2.36
14	4.76	3.05	2.54
15	5.10	3.27	2.72
16	5.45	3.48	2.90
17	5.79	3.70	3.09

18	6.13	3.92	3.27
19	6.47	4.14	3.45
20	6.81	4.36	3.36
21	7.15	4.57	3.81
22	7.49	4.79	3.99

Spread Patterns

Acceptable spread patterns include the flat top, the pyramid and oval as in Figure 2.

If your spreader does not spread any of the above acceptable patterns or something very close, make adjustments to the spreader using the operators manual until an acceptable pattern is realized. It should be noted that the application rate is the amount at the center of the pattern (if acceptable pattern). The application should be uniform if the pattern is acceptable and proper swath width is observed.

Unacceptable patterns are shown in Figure 3. If the pattern is unacceptable, adjustments must be made until an acceptable pattern is found before swath width and application rate can be determined.

If a metric scale is used, the following table will be beneficial.

Materials Collected *=* *Rate of Application*

grams/sq. ft. *lbs./acre*

1	*=*	96.0
5	*=*	480.2
10	*=*	960.3
15	*=*	1440.5
20	*=*	1920.7
25	*=*	2400.8

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