

Calibration of Sugarcane Sprayers



Banded application of herbicide in March before sugarcane emergence using three nozzles per row.



Broadcast application of herbicide in March after sugarcane residue has been removed by mowing.



Broadcast application of herbicide in May at layby using two nozzles per row middle.



Typical three nozzle per row arrangement for banded application of herbicide.

Calibration of Sugarcane Sprayers

What is Calibration?

- Mathematical determination of how much spray solution is applied per acre
- The amount of spray solution can be varied by changing one or more of the following:
 - Nozzle size
 - Ground speed
 - Nozzle spacing on spray boom
 - Spray Pressure

Note: *Pressure has the least effect on spray volume but is important in maintaining proper spray pattern. High spray pressure can decrease spray droplet size and increase potential for spray drift.*

Why is Calibration Important?

- Accurate calibration is necessary to ensure that desired amount of herbicide is applied.
- Under-application of herbicide caused by inaccurate calibration can result in failure to control weeds.
- Over-application of herbicide caused by inaccurate calibration can increase crop injury, add chemical expense and possibly lead to pollution of the environment.

Sprayer Calibration Procedure

1. Before beginning, check for leaks and uneven nozzle spray patterns. Replace worn nozzles and hoses and make sure screens are clean.
2. Using the nozzle spacing in inches for a broadcast application or the band width in inches for a banded application, determine calibration distance in feet from Table 1.

Table 1. Distance needed to calibrate sugarcane sprayers using nozzle spacing for broadcast application and band width for banded application.

Nozzle Spacing / Band Width inches	Calibration Distance feet
12	340
14	291
16	256
18	227
20	204
24	170
28	146
32	127
34	120
36	113
38	107
40	102
48	85
66	62
68	60
70	58
72	57

Note: To determine a calibration distance not provided in the table, divide 340 by the nozzle spacing or band width in feet.

3. Measure distance in the field to be sprayed or in a field with similar surface conditions and determine the number of seconds it takes to travel the distance. If the field is wet, tire slippage will result in inaccurate timing. Repeat for accuracy and record the time required, tractor used and gear and throttle setting (RPM).

Calibration Procedure Continued

4. With tractor in neutral and **at the selected throttle setting**, collect water delivered for the number of seconds required to travel the calibration distance.

- Collect from one nozzle for broadcast application.
- Collect from all nozzles treating one row for a band application (three per row common).
- Collect from all nozzles per row middle for a broadcast application at layby.

5. The number of ounces of water collected equals gallons per acre on a **broadcast basis**. For example, 15 ounces = 15 gallons per acre broadcast.

Remember that total ounces may represent delivery from more than one nozzle, depending on whether the herbicide is applied broadcast or on a band. To increase gallons per acre, decrease speed, use a larger spray tip and/or increase spray pressure.

Note: *The sprayer is being calibrated on a broadcast basis because rates specified on herbicide labels and in the LSU AgCenter Chemical Weed Control Guide represent the amount of formulated material needed per acre on a broadcast basis.*

6. Check delivery of all nozzles on spray boom and replace when output has changed 10 percent or more from that of a new nozzle tip.

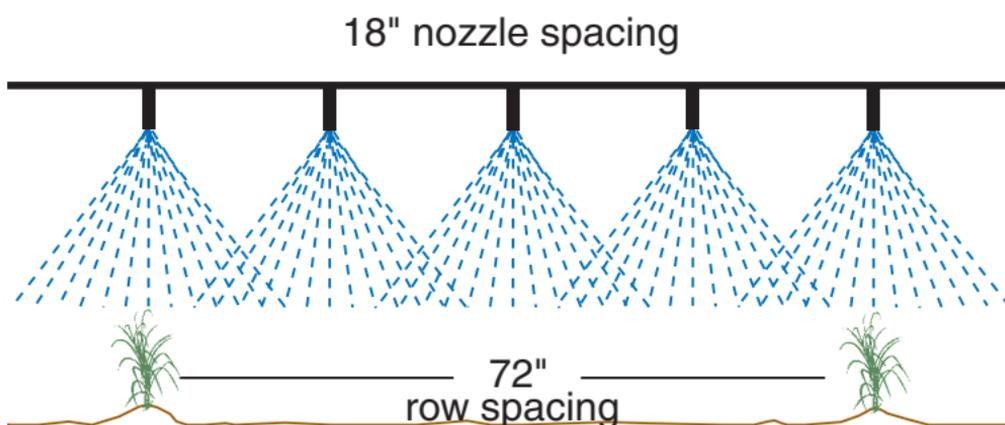
7. Keep a record of the tractor used and the gear and throttle setting, time required to travel the calibration distance and the number of ounces collected. Recheck sprayer calibration periodically.



Banded application of herbicide in April for johnsongrass control using three nozzles per row.

Specific Sprayer Calibration Examples

Broadcast Application of Herbicide



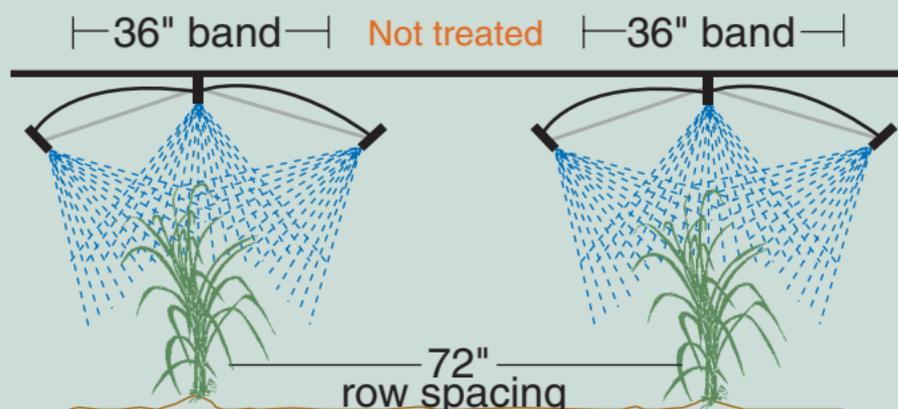
Herbicide is to be applied broadcast using a boom with nozzles spaced 18 inches apart. **For this example, when the tractor and sprayer travel over one acre, the entire acre will be treated with spray solution.**

- If the average collection per nozzle is 10 ounces for the number of seconds required to travel 227 feet (see Table 1; 18 inches = 227 feet), then you are applying 10 gallons per acre broadcast.
- A 200-gallon spray tank will treat 20 acres **broadcast**.
- For a herbicide rate of 1 quart per acre, you should add 20 quarts (5 gallons) of herbicide to 195 gallons of water.
- For a herbicide rate of 2 pounds per acre of a dry formulation, you should add 40 pounds of herbicide to the spray tank; the total spray volume should be 200 gallons.

Note: *If a nonionic surfactant is added to the spray solution at 0.5 percent concentration by volume (2 quarts per 100 gallons of water) then for this example add 4 quarts (1 gallon) of surfactant to the 200-gallon spray tank.*

Specific Sprayer Calibration Examples

Banded Application of Herbicide



Herbicide is to be applied on a 36-inch band using three nozzles per row with rows spaced 72 inches apart. **For this example, when the tractor and sprayer travel over one acre, only half of the traveled acre is treated with spray solution (36-inch band / 72-inch row spacing = 0.50).**

■ If the total collection from the three nozzles per row for the banded application is 10 ounces for the number of seconds required to travel 113 feet (see Table 1; 36-inch band = 113 feet), then you are applying 10 gallons per treated acre on a **broadcast** basis.

■ A 200-gallon spray tank will treat 20 acres **broadcast**.

■ For a herbicide rate of 1 quart per acre **broadcast**, you should add 20 quarts (5 gallons) of herbicide to 195 gallons of water.

■ For a herbicide rate of 2 pounds per acre **broadcast** of a dry formulation, you should add 40 pounds of herbicide to the spray tank; the total spray volume should be 200 gallons.

Note: In this example the 200-gallon spray mix will treat 20 acres, but the tractor and sprayer will travel over 40 acres. Remember that the concentration of herbicide in the spray solution is the same whether the herbicide is applied broadcast or on a band.

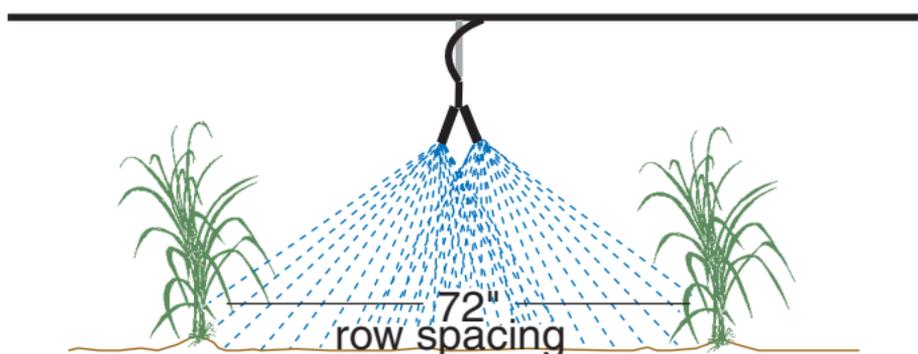
To calculate the band rate per **traveled** acre for a liquid or dry herbicide formulation, use the following formula:

$$\frac{\text{Band width in inches}}{\text{Row width in inches}} \times \text{Broadcast rate per acre} = \text{Band rate per traveled acre}$$

Specific Sprayer Calibration Examples

Broadcast Application of Herbicide at Layby

72" nozzle spacing



Herbicide is to be applied broadcast using either one or two nozzles on a single drop positioned in the center of the row middle where rows are spaced 72 inches apart. Since the nozzle drops are spaced 72 inches apart, spray solution will cover from row top to row top of adjacent rows. **For this example, when the tractor and sprayer travel over one acre, the entire acre will be treated with spray solution.**

- If the total collection from the two nozzles per row middle is 10 ounces for the time required to travel 57 feet (see Table 1; 72 inches = 57 feet), then you are applying 10 gallons per acre broadcast. If only a single nozzle per row middle is used, then you would need to catch 10 ounces from the nozzle.
- A 200-gallon spray tank will treat 20 acres **broadcast**.
- For a herbicide rate of 1 quart per acre, you should add 20 quarts (5 gallons) of herbicide to 195 gallons of water.
- For a herbicide rate of 2 pounds per acre of dry formulation, you should add 40 pounds of herbicide to the spray tank; the total spray volume should be 200 gallons.

Note: Calibration distance for the 72-inch nozzle spacing is only 57 feet (see Table 1). Calibration accuracy would be increased if the distance is doubled to 114 feet (57 feet x 2).

- Collect for number of seconds required to travel 114 feet from either the two nozzles or one nozzle (depending on the number per row middle).
- $\frac{\text{Ounces collected}}{2} = \text{Gallons per acre}$

Calibration of Sugarcane Sprayers

James L. Griffin, Weed Scientist
and **Lee F. Mason** LSU Alumni Association Professor

Department of Agronomy and Environmental Management
LSU AgCenter, Baton Rouge, Louisiana

For other information related to weeds
and weed management, visit
www.lsuagcenter.com/weedscience.



*Broadcast application of herbicide in August
after sugarcane planting.*



Visit our Web site: www.lsuagcenter.com

Louisiana State University Agricultural Center

William B. Richardson, Chancellor

Louisiana Agricultural Experiment Station

David J. Boethel, Vice Chancellor and Director

Louisiana Cooperative Extension Service

Paul D. Coreil, Vice Chancellor and Director

Pub. 2910

(2M)

12/04

Issued in furtherance of Cooperative Extension work,
Acts of Congress of May 8 and June 30, 1914, in cooperation
with the United States Department of Agriculture.
The Louisiana Cooperative Extension Service provides
equal opportunities in programs and employment.