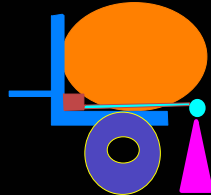




Low Pressure Boom Sprayer Calibration

George Hamilton
Extension Educator
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Why Calibrate a Boom Sprayer?

- To Insure Uniform Application
- Apply the Proper Amount Pesticide
- Help Insure Proper Pest Control
- Less Chance of Crop Injury
- Prevent Pesticide Carryover
- Minimizes Effects in the Environment
- Save Money
 - Cost of Over Application
 - Cost of Re-treatment

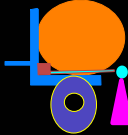
Calibration of Boom Sprayer Equipment

Study made by University of Nebraska

- 60% of sprayers have a calibration error of plus or minus 10%
- 43% of sprayers have plus or minus 10% variation discharge for individual nozzles
- 32% of sprayers have inaccurate travel speed
- 27% have improper boom height
- 13% inaccurate pressure gauges
- 8% have inadequate hose size to supply nozzles

First, Check Sprayer For Potential Problems

- Worn or Loose Fitting Nozzles
- Leaking Connections or Valves
- Properly Working Pump
- Cracked, Split or Worn Hoses
- Clogged Strainer
- Make Sure All Nozzles Are The Same Type and Size
- Sprayer Tank Is Clean
- Check Nozzle Spacing
- Check Boom Height

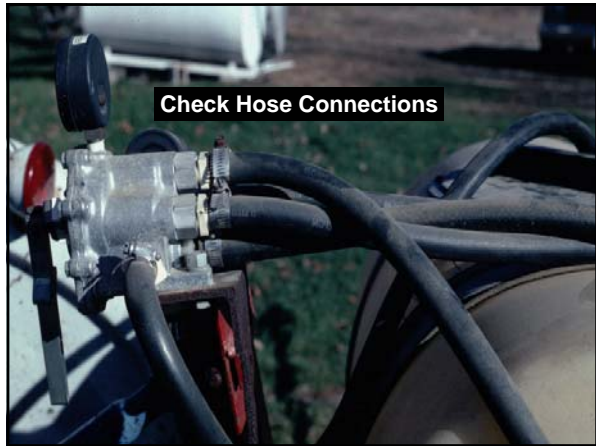




Check Nozzle Tips and Hose Connections



Check Boom/Nozzle Height



Check Hose Connections



Check Hose Connections and Boom Support



Set Pressure Regulator to Your Recommended Operating Pressure

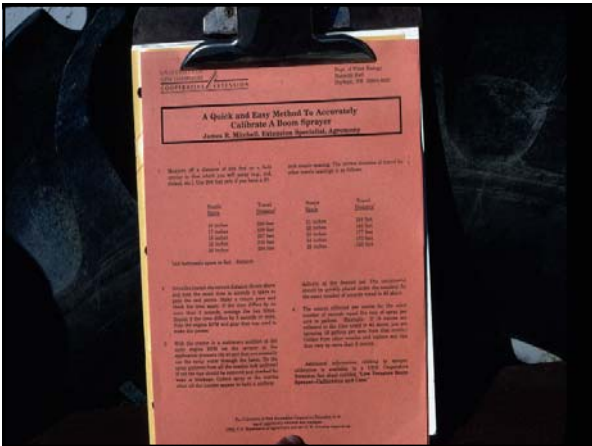
Charge Boom and Check Nozzle Tips Spray Pattern



Check Distance Between Nozzle Tips



A Quick and Easy Method To Accurately Calibrate A Boom Sprayer



A Quick and Easy Method To Accurately Calibrate A Boom Sprayer

Step #1

- Measure distance between nozzles
- Look up distance to be traveled on given table
- Measure off the distance

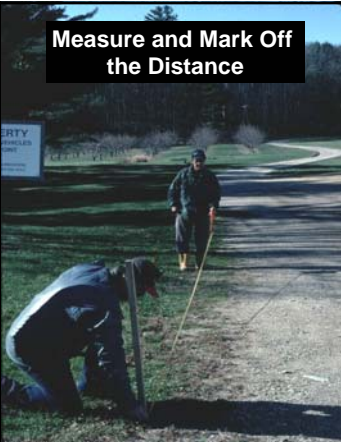
A Quick & Easy Method To Accurately Calibrate A Boom Sprayer

Test Course Length For Determining
Spraying Time & Collection

| Nozzle Spacing (in) | Driving Distance (ft.) | Nozzle Spacing (in) | Driving Distance (ft.) |
|---------------------|------------------------|---------------------|------------------------|
| 40 | 102 | 24 | 170 |
| 38 | 107 | 22 | 185 |
| 36 | 113 | 20 | 204 |
| 34 | 120 | 18 | 227 |
| 32 | 127 | 16 | 255 |
| 30 | 136 | 14 | 291 |
| 28 | 146 | 12 | 340 |
| 26 | 157 | 10 | 408 |



Measure and Mark Off the Distance





A Quick and Easy Method To Accurately Calibrate A Boom Sprayer

Step #2

- Drive tractor over given distance
- Record time in seconds
- Make return pass
(times should not differ more than 2 seconds)
- Note engine RPM and gear that were used (write them down...)



Time Tractor Over The Given Distance in Seconds





A Quick and Easy Method To Accurately Calibrate A Boom Sprayer

Step #3

- Tractor At Stationary Position Set Engine R.M.P. the Same Used In #2
- Set Sprayer Pressure (30-40 psi)
- Spray Water Through the Boom
- Check Spray Patterns From All The Nozzles
- Collect Spray At Each Nozzle For The Exact Same Number Of Seconds In #2



A Quick and Easy Method To Accurately Calibrate A Boom Sprayer

Step #4

- Record Ounces Collected Per Nozzle and Calculate Average Amount Of Spray Collected Per Nozzle
- Ounces Collected Per Nozzle For The Exact Number Of Seconds Equals The Rate Of Spray Per Acre In Gallons
- Replace Nozzles That Vary By More Or Less Than 10 Percent





Calculate the Average Output Per Nozzle For the Boom Sprayer



Remember, Each Fluid Ounce Collected Equals One Gallon. The Average Output Per Nozzle Is 27.5 Gallons Per Acre.



What Could Have Happen To This Nozzle?



What Could Have Happen To This Nozzle?



There Are Devices That Calculate The Flow Rate.

Calibrate The Following Items

- Average output per nozzle
- Gallons per acre (applied)
- Miles per hour (traveled)
- Gallons per minute (output)

Average Output Per Nozzle

Nozzle #1 - 27.5
Nozzle #2 - 28.5
Nozzle #3 - 28.0
Nozzle #4 - 27.5
Nozzle #5 - 27.5
Nozzle #6 - 27.0
Nozzle #7 - 28.0
Nozzle #8 - 27.5
Nozzle #9 - 27.5
Nozzle #10 - 27.0
Nozzle #11 - 27.5
Nozzle #12 - 26.5

Total Output For Boom Equals
330 Fluid Ounces

Average Output Per Nozzle Is
Equal To:

330 Fluid Ounces/12 Nozzles

Average Output Per Nozzle Is
Equal To:

27.5 Fluid Ounces

Gallons Per Acre (Applied)

Remember for this Calibration Method,
Each Fluid Ounce Collected
Equals One Gallon Applied.

Average Output Per Nozzle Is
Equal To 27.5 Fluid Ounces

Gallons Per Acre (Applied)
Is Equal To

27.5 Gallons

Determining Ground Speed

$$\text{Speed} = \frac{\text{Distance [in feet]} \times 60}{\text{Average Time [in seconds]} \times 88}$$

"88 feet in 60 seconds equals 1 mile per hour"

Example In Determining Ground Speed

$$\text{Speed} = \frac{\text{Distance [in feet]} \times 60}{\text{Average Time [in seconds]} \times 88}$$

$$\text{Speed} = \frac{204 \text{ feet} \times 60}{34.5 \text{ seconds} \times 88}$$

$$\text{Speed} = \frac{12240}{3036}$$

$$\text{Speed} = 4.0 \text{ M.P.H.}$$

"88 feet in 60 seconds equals 1 mile per hour"

Converting Gallons Per Acre To Gallons Per Minute (GPM)

$$\text{GPM} = \frac{\text{GPA} \times \text{MPH} \times \text{Nozzle Spacing (Inches)}}{5940}$$

Example of Converting Gallons Per Acre of Gallons Per Minute

$$\text{GPM} = \frac{\text{GPA} \times \text{MPH} \times \text{Nozzle Spacing (Inches)}}{5940}$$

$$\text{GPM} = \frac{27.5 \text{ GPA} \times 4 \text{ MPH} \times 20" \text{ Nozzle Spacing}}{5940}$$

$$\text{GPM} = \frac{2200}{5940} = 0.37$$

GPM = (For 8004VS TeeJet Spray Tip @ 30 PSI) 0.35

Pre-Season Sprayer Checkup

- Spring is here!
- It is time to give your sprayer a thorough going over before it's time to go the field.
- This will help you spot needed maintenance and repairs before they cause problems at spray time.



Save Money: Maintain Your Sprayer

Worn Sprayer nozzles, poorly maintained check valves, too low a height and excessive pressure were problems cited in a 2000 Oregon State University study on sprayer use.

Sprayer problems can cost big money. "One grower over-applied by 12%, which cost him an extra \$2,938 in pesticides."

Calibration

- Correct & effective amount of pesticide is delivered
- Saves money & legal problems
 - exceeding legal rate
- Reduces off target movement



Remember With All Pesticides

Always Read And Follow
All Label Directions!

THE LABEL IS THE LAW!
