Calibrating Air Blast and Weed Sprayers
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UC Cooperative Extension

Grower: _______________________  Date: ____________ ___

The basic steps in calibrating a sprayer are listed below. Use #1 to set up the sprayer to deliver the desired application rate. Then use #2-4 to ground-truth the application rate by measuring it.

1. Estimate Flow Rate (from published manufacturer data)
2. Measure Flow Rate
3. Calculate Land Rate
4. Calculate Amount of Pesticide to Put in Tank

Sprayer Type:__________________________

Check: ________ 1. Filter screens and strainers clean?
________ 2. Tank clean and free of scale and sediment?
________ 3. Pressure gauge operating properly?
________ 4. Nozzles working properly?

<table>
<thead>
<tr>
<th>LEFT Manifold</th>
<th>Nozzle Type</th>
<th>Nozzle Size</th>
<th>Rated Output (gal./min.) @ _____ psi</th>
<th>RIGHT Manifold</th>
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<th>Rated Output (gal./min.) @ _____ psi</th>
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Total Left Output | Total Right Output

TOTAL (Right + Left) Estimated Flow Rate = _______ gal./min.

Draw diagram of spray boom and nozzle numbers on the back of this page.
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2. Measure Actual Flow Rate

WEED SPRAYER:
1. Park sprayer on level ground
2. Fill tank about 1/2 full
3. Turn on sprayer with nozzles open and run at normal operating pressure
4. Place measuring cup under a nozzle to catch the flow for a period of time (T)  
   \[ T = \underline{\text{sec.}} \]
   \[ T \times 1 \text{ min./60 sec.} \quad T = \underline{\text{min.}} \]
5. Record volume collected during that time (V) and units (ml. or oz.)  
   \[ V = \underline{\text{unit? \_\_\_}} \]
6. Calculate volume in gallons for that nozzle  
   \[ V = \underline{\text{gal.}} \]
   
   1 gal. = 4 qts. = 8 pts. = 128 fl. oz.
   1 gal. = 3.8 L
   1 L = 0.264 gal.
7. Calculate flow rate (gal/min) for that nozzle  
   \[ \frac{V(\text{gal.})}{T(\text{min.})} = \underline{\text{gal./min.}} \]
8. Repeat steps 4 - 6 for each nozzle
9. Record actual flow rate for all nozzles @ \( \underline{\text{psi}} \):

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TOTAL Actual Flow Rate = \( \underline{\text{gal./min.}} \)

AIR BLAST SPRAYER:
1. On level ground, fill sprayer completely
2. With tractor stationary, bring tractor RPM up to sprayer PTO speed (typically 540)
3. Open nozzles and run for a period of time (T)  
   \[ T = \underline{\text{min.}} \]
4. Check pressure while nozzles are open. Record operating pressure:  
   \( \underline{\text{psi}} \)
5. Refill the tank completely, measuring the amount of water used in gallons (G)  
   \[ G = \underline{\text{gal.}} \]
6. Calculate actual flow rate  
   \[ \frac{G}{T} = \underline{\text{gal./min.}} \]
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3. **Calculate Application Rate**

   **Tractor model:** _____________________________

   **A. Measure tractor speed**
   1. Establish a distance (at least 100 ft.) and flag it - in crop rows best
      \[ D = \text{ft.} \]
   2. Fill sprayer tank at least 1/2 full

   **B. Measure the time it takes for the sprayer to travel the distance**
   Do 3 times and average
   
   - 1st run ______________ sec.
   - 2nd run ______________ sec.
   - 3rd run ______________ sec.
   
   Average (T) = ______________ sec.

   Convert seconds to minutes: \[ T = \text{min.} \]

   **C. Calculate speed traveled (D/T)**
   
   - In ft./min.: \[ \frac{D}{T} = \text{ft./min.} \]
   - In MPH: \[ \frac{D}{T \times 88} = \text{mi./hr.} \]

   **D. **WEED SPRAYER:** Determine swath width (W) with tractor sitting on level dry surface and sprayer at planned operating pressure.
   1. Turn on nozzles (with water) and measure width of spray pattern. Remember to measure the swath width using the same nozzles that were used to measure the flow rate.
      \[ W = \text{ft.} \]

   **D. **AIR BLAST SPRAYER:** Swath width (W) for an air blast sprayer is the between-row spacing, or 2 rows for double-row vineyard sprayers.
   \[ W = \text{ft.} \]

   **E. Calculate land rate (LR):** Speed (ft./min.) \( \times \) Width (ft.)
   
   Speed __________ ft./min. \( \times \) Width __________ ft. = LR __________ ft.\(^2\)/min.

   Convert to acres/min.:
   
   \[ 1 \text{ acre} / 43,560 \text{ ft.}^2 \times LR (\text{ft.}^2/\text{min.}) = \text{ acre/min.} \]

   **F. Calculate application rate**
   
   Application Rate (gal./acre) =
   
   Flow Rate __________ (gal./min.) \( \div \) Land Rate __________ (acre/min.)

   Application Rate = ___________ gal./acre
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4. Calculate amount of pesticide to put in tank

   A. How many acres can one tank spray?

      Tank Capacity \( \text{_______ gal.} \div \text{Application Rate \text{_______ gal./acre}} \)

      \( \text{=} \text{_______ Sprayed Acres/Tank} \)

   B. Amount of pesticide/tank:

      \( \text{Recommended amount of pesticide/acre \text{_______ \times acres/tank \text{_______}}} \)

      \( \text{=} \text{_______ Pesticide/Tank} \)