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UK COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE
Horticulture Department

Calibration of Air-Blast Sprayers

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To apply the correct amount of chemicals recommend for control of grapevine pests, the air-blast sprayers need to be calibrated accurately. Failure to calibrate the air-blast sprayers will result in wasted money, crop injury and chemical drift. Frequent calibration of the air-blast sprayer will identify worn nozzles, and will alert the grower of factors affecting application rate such as travel speed, operating pressure and type of nozzle and whirl plate in use.

Precalibration or Pre-operation checks

Before calibrating or using the air-blast sprayer the grower must complete these steps regularly to ensure personal safety and safe operation of the air-blast sprayer:

Mechanical:
a) Is the air-blast sprayer attached to the tractor securely? ___
b) Is the PTO shaft guard in place? ___
c) Have the air-blast PTO shaft, the fan system been greased according to manufacturer's recommendations? ___

Hydraulic system:
a) Are the connections clean, free of soil, sand, etc? ___
b) Are hoses or connections worn or cracked ? ___
c) Are connections or hoses free from leaks under pressure? ___

Electrical system:
a) Is wiring undamaged and are all connections properly insulated? ___
b) Are all switches properly labeled? ___

Spray tank:
a) Is the tank securely fastened to the air-blast chassis ? ___
b) Is the tank free of leaks or cracks? ___
c) Is the tank lid securely attached? ___
d) Can you read the contents gauge clearly ? ___

Spray lines:
a) Are they free from leaks under operating pressure? ___
b) Are any of the hoses or connections worn or cracked? ___
c) Are the solenoid valves and the filters in working condition? ___

Spray nozzles:
a) Are all the solenoid valves in working condition? ___
b) Are all fittings in good condition? ___
c) Are all the nozzles correctly oriented? ___
d) Is the spray distribution pattern correct? ___

Control valves:
a) Are the master on/off switches working properly ? ___
b) Are left and right boom control switches working properly? ___
c) Are the gauges easily readable? ___
d) Is the system pressure stable when the control valves are turned on ? ___

Chemical induction system:
a) Are the control valves working properly ? ___
b) Are there any leaks when the system is turned on ? ___
c) Is the tank rinse system working properly ? ___

The following steps must be followed periodically to ensure safe and sound operation of air-blast sprayers in vineyards.

Determining sprayer speed:

The rate of travel (speed) needed for proper distribution of spray onto the canopy must be determined by placing water sensitive spray paper at various heights within the canopy. In general, a travel rate of 1 to 3 miles per hour provides satisfactory coverage depending on the size, density and height of the canopy.

To determine travel speed:
1) Fill tank with clean water
2) Measure 176 feet in similar terrain to vineyard row(s)
3) Set tractor throttle at a level sufficient to operate the sprayer (PTO speed) and selected correct gear)
4) Write down the throttle and gear selections
5) Use following formula to calculate rate of travel

Formula: Rate of travel (mph) = (Distance ft x 60) / (time sec x 88)

Example: If it requires 60 seconds to travel a measured distance of 176 feet, then the rate of travel will be: mph = (176 x 60) / (60 x 88)
mph = 2 mph

Determining nozzle flow rate:
To select the correct nozzle and whirl plate sizes, the gallons per minute (GPM) output for each particular application must be determined. To determine GPM it is necessary to know the travel rate (mph) calculated in the prior step, the gallons per acre (GPA) to be applied, and the spacing (W) between the rows.

To determine nozzle flow rate:
1) Fill tank with clean water
2) Check operating pressure at the furthest nozzles
    a) Pressure at nozzle _____psi
    b) Pressure at sprayer gauge _____psi
3) Measure nozzle output
    a) Use a flow meter attached to individual nozzles
    if flow meter is not available
    b) Connect hoses to each of the nozzles and measure the flow from each nozzle into a calibrated jug If the output of one nozzle from figure below measures 30 fluid ounces per minute then the GPM is = 30 fl. oz/128 fl. oz per gallon 0.23 GPM.
    c) Using the figure and the formula below calculate GPA to be applied.
    d) Add all the open nozzle outputs per side to calculate the Total GPM

Formula: GPA = (Total GPM x 495) / (mph x W ft)
Example: Using 6 nozzles, a travel rate of 2 mph and a row spacing of 10 ft:
$GPA = \frac{(0.23 \times 8) \times 495}{2 \times 10} = 45.5$ GPA

$$GPA = \frac{GPM \times 495}{mph \times ft}$$

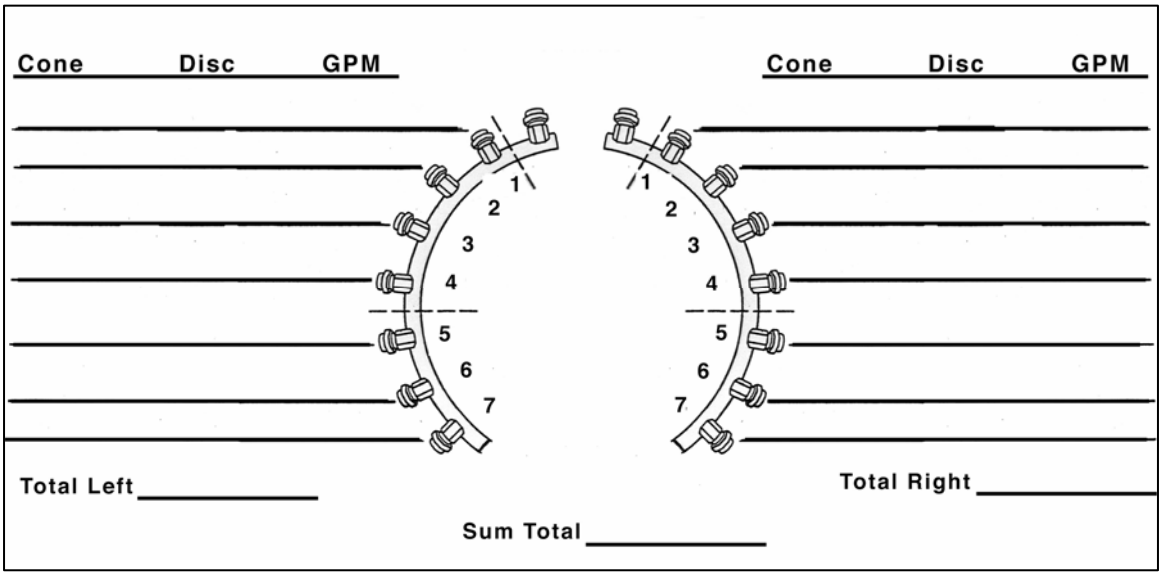

Figure 1. Representative illustration of an air-blast sprayer boom. Figure courtesy of Dr. Andrew Landers, NYSAES, Cornell University, Geneva, NY