Pest Management II: Equipment Selection and Calibration

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Extension Educators
Keep a tidy and well organized shop

Note Required Postings
Equipment Needed After Establishment…
Tractors

• Some people get a tractor because they have a vineyard; but…
• Others get a vineyard so they can have a tractor
Tractors

- 40-50 HP is sufficient for most operations
- PTO and three point hitch
- A cab is a nice feature for spraying applications
- Remember row width v/s tractor size
Look to other grape growing regions for equipment...
Spraying Equipment

- Understanding Sprayer Plumbing
- Agitation & Bypass
- Nozzle Tip Selection
- Boom Height & Target
- Boom Pressure Gauge

50 gal Low Volume Vineyard Sprayer
Good Source of Sprayer Info: Andrew Landers

- Pesticide Application Technology Specialist
- Cornell University
- New York State Agricultural Experiment Station
- Geneva, NY 14456

Note: Much of the information contained in the following slides regarding vineyard sprayer set-up, calibration and use is from Dr. Landers. See the accompanying publications from Dr. Landers for more information.
Vineyard Sprayers

**RM 65-110 Vineyard Sprayer**

**RM 25 Utility w/ 5 Nozzle Boom**

**Model DP10P50P Air Sprayer**

**RM 55 Utility Sprayers**
Always wear protective clothing
Special Sprayer Maintenance

- Flush & Rinse Sprayer as Required by Products
- Check Nozzle Output Uniformity
- Clean & Lubricate Pump and Other Components
- Inspect for Leaks
- Winterize

What procedure insures thorough rinsing of a sprayer?

RM 65-110 Vineyard Sprayer
Calibration Info from Cornell:

- A simple vertical patternator can be constructed in the farm workshop using readily available materials; a build list and photographs can be found at: [http://www.nysaes.cornell.edu/ent/faculty/landers/pdf/Patternator.pdf](http://www.nysaes.cornell.edu/ent/faculty/landers/pdf/Patternator.pdf)

- Videos showing calibration and nozzle selection may be found on the internet at: [www.youtube.com](http://www.youtube.com) Type in: "Calibration of airblast sprayers for orchards part 1 selecting and changing nozzles" or "Calibration of airblast sprayers for orchards part 2 measuring liquid flow"
Applying Fungicides in Vineyard

• Spraying Goal
  – Excellent coverage of all foliage
  – Application of correct amounts
  – Minimize spray drift

• Keys to Success
  – Proper sprayer setup
  – Use air blast sprayer
  – Orient nozzles correctly
  – Calibrate equipment correctly
Airblast Sprayer

• Typical Full Canopy Rate of 100 Gallons per acre
• Reduce fan speed for earlier applications
Good spray coverage starts with good canopy management
Airblast Sprayer Calibration

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Information from:
Andrew Landers
Dept. of Agricultural and Biological Engineering
Cornell University, Ithaca, NY 14853
Nozzle Output

• Use a flow meter (obtainable from Gemplers, Spraying Systems, etc.) attached to individual nozzles OR

• Connect hoses to each of the nozzles and measure the flow from each nozzle into a calibrated jug.

• Remember 128 fl. ozs in one gallon.
• Example: If the output of one nozzle has been measured at 34.5 fl.ozs, then output is divided by 128 = 0.27GPM in one minute.

• Replace all nozzle tips which are more than 10% inaccurate.

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Cornell University, Ithaca, NY 14853
Travel Speed Calibration

Formula: \( \text{MPH} = \frac{\text{ft. traveled}}{\text{sec. traveled}} \times 60 \)

\( \frac{88}{88} \)

Your figures:

Tractor gear___________ Engine revs.___________

\( \text{MPH} = \frac{\text{ft. traveled}}{\text{sec. traveled}} \times 60 = \frac{88}{88} = \)
Airblast Calibration Formula

Formula: \[ \text{Total GPM} \times 495 = \text{GPA} \]
\[ \text{mph} \times \text{row spacing (ft)} \]

Your figures:
\[ \frac{\text{X} \times 495}{\text{GPA}} = \]
\[ \text{mph} \times \text{X} \times \text{ft.} \]

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Nozzle Orientation

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Airflow is Not equal on each side of an air blast sprayer

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Dept. of Agricultural and Biological Engineering
Cornell University, Ithaca, NY 14853
Nozzle Orientation

The best spray pattern for the grape zone:

• Right hand side nozzles: Pointing horizontally and the top two nozzles were 20° below horizontal

• Left side nozzles pointing 45° upwards to counteract the downward direction of the air from the fan.
Suggestions from Dr. Landers

During pre-bloom sprays do not use the fan on the sprayer. High airflow isn’t necessary as the target area is so small.

If you do use the fan for pre-bloom sprays, drive at higher forward speeds. The forward speed deflects the air rearwards at an angle into the target. In mid-late season, drive slowly to allow air time to penetrate the canopy.

Spray every row, not alternate rows. Trials show better deposition occurs when every row is sprayed.
Maintenance

• Battling Dirt & Friction
• Keep Equipment Clean to Spot Trouble & Service
• Lubricate and Grease on Schedule

What are symptoms of a failing part?
Calibration & Adjustment

• Pay Close Attention to the Operators Manual
• Set Machine for Field Conditions
• Stop! – If Outcome is Not Desirable to Readjust
• Machinery May Require Added Attachments for Proper Jobbing
Tasking & Sequencing

• The “Narrow Window” Concept – Plan Accordingly
• Careful Thought Before Heading to the Field
• Pre-Determine a Tasks Time Requirement
• Machinery Usage at Economic Maximum

How can we measure machinery being used at its economic maximum?
Vineyard Supplies & Equipment
CMREC, Upper Marlboro Farm

Any Questions?

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