Vineyard Sprayer Technology

Dr. Michelle M. Moyer
Asst. Prof. - Viticulture Extension
WSU-IAREC
Email: michelle.moyer@wsu.edu

OVERVIEW

• Education Foundation
  – Sprayer components: Why they matter
  – How to prepare sprayers for the growing season
  – The importance of proper application
    • Spray coverage and deposition
    • How and when to apply sprays
    • Sprayer modifications

VINEYARD RESOURCE BOOK

www.effectiveSpraying.com

Most of this information can be found in this practical, for-grower, book.

SPRAYER COMPONENTS

• Basic Sprayer Parts:
  – Tank
  – Agitator
  – Pump
  – Pressure regulator
  – Pressure gauge
  – Control valve
  – Distribution valves
  – Nozzles

TANK

• Tank
  – Many kinds: Galvanized steel, aluminum, polyethylene, fiberglass, stainless steel.
  – Take capacity determines weight, refilling speed
  – Some include pesticide induction bowls
  – Shape of tank influences agitation
  – Sight gauge
### Agitators
- Agitators keep pesticides in solution
  - Mechanical agitators
  - Hydraulic agitators
  - Compressed air agitators
- Fill tank to 50% and start agitator before adding pesticides.

### Pumps
- Pumps create the pressure to propel spray
  - Flow rate capacity should be more than the maximum needed
  - Pumps are sensitive to the materials spray (abrasive or corrosive materials)
- Many pump types:
  - Piston, diaphragm, centrifugal, roller

### Pressure Regulators and Gauges
- Pressure regulators protect pumps from excess pressure
- Regulating pressure, and knowing what your pressure is, is crucial for spray output
- Control and Distribution valves control flow rate to nozzle.

### Nozzles and Filters
- Filters: they are everywhere!
  - Larger filter size at tank: smaller at nozzle
  - Strain out debris
  - MUST CLEAN AND CHECK
- Nozzles:
  - Key in droplet size!
  - Must select appropriate nozzle for machine

### Sprayer Designs

### Airblast
- Easy to adjust
- High speed air
- Standard nozzles
AIRBLAST ADJUSTMENTS

Reduce or redirect air flow

DIRECTED AIR

- Good canopy agitation

TUNNEL/RECYCLING/HOODED BOOM

- Can help reduce drift/pesticide loss

ELECTROSTATIC

- Helps reduce drift, increase deposition on plants

BACKPACK/SELF-MOUNTED

- Cheapest alternative
- Hard to calibrate rates
- Recommended for small vineyards only

Sprayer Calibration and Preparation
Proper Spray Application

• Proper application consists of:
  – The right equipment
  – Proper calibration
  – Appropriate droplet size
  – Reducing drift to reduce loss
  – The right material
  – The right timing
  – Documentation
**SPRAY PATTERN AND CANOPY SHAPE**

Before

After

**SPRAYER ALTERATIONS**

- Minimize air volume
- Redirect air

**SPRAY DEPOSITION**

- Droplet size matters
  - >350 um will bounce
  - <150 um will drift

<table>
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<th>Fine</th>
<th>Medium</th>
<th>Coarse</th>
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<td>119-216 µm</td>
<td>217-353 µm</td>
<td>354-464 µm</td>
<td>&gt;464 µm</td>
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- Insecticides/ Fungicides
- Herbicides/ Post-emergence
- Herbicides/ Soil Applications

**DRIFT**

- In early season, reduce water volume
- Turn off fan on airblasts for pre-bloom applications; drive faster to deflect air if fan is on

**SPRAY RATE VS. CONCENTRATION**

- Rates are a LEGAL obligation
- Rates are effectively a concentration based on land area (i.e. 3oz/Acre)
- Concentration is based on water volume used. This is adjustable.
- Reduced water volume (i.e. higher concentration) helps reduce drift in early season
  - However, you are still applying the same RATE. (3 oz/A/30 gal vs 3 oz/A/50 gal)

Higher pressure=smaller droplet size. Controlling pressure is crucial!
**Managing Pesticide Resistance Development**

- Pests and pathogens can quickly develop resistance to pesticides
  - A result of the rate and coverage of application
  - A result of generation time
  - A result of repeated exposure
- Irresponsible management of pesticide programs ruins it for EVERYONE.

**Ways to reduce pesticide resistance development:**
- FOLLOW LABEL INSTRUCTIONS
- Rotate through chemistries with different modes of action
- Do not reduce rates below recommendations

**Why Rates Matter**

- Proper Spray Rate
- Illegal Spray Rate

**Planning**

Don’t be caught off guard!

- Easy to make adjustments from a set program, hard to make them on the fly.

**Monitoring the Weather**

- AgWeatherNet [www.weather.wsu.edu](http://www.weather.wsu.edu)
- What was the weather last week? Now? Forecast?
- Weather is important!

**Weather and Drift**

- Wind speed: Avoid spraying >10mph (best is 3-10mph)
- Temperature Inversions= Stable, stagnant atmosphere. Potential long-distance drift of smaller particles
- High temperature can cause volatilization
- Cold temperature can cause inactivity
- Low humidity may increase drift
RECORD KEEPING—IT’S THE LAW

- You MUST record all pesticide applications.
  - Sample records and forms are available at: http://agr.wa.gov
- Additional things that are worthy to note:
  - Past and present weather conditions
  - Vine development
  - Notes on disease or pest pressure

QUESTIONS?

CONCLUSIONS

- Know sprayer components for maintenance
- Many sprayer types are available
- Calibration and adjustment is critical
- Proper spray application is more than just hitting the target